



# Reasonable Further Progress

## Rate-Of-Progress Plan

San Bernardino County Portion of the Southeast Desert AQMA

October 26, 1994

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## SUMMARY

On November 15, 1990, the Federal Clean Air Act Amendments of 1990 (FCAA) were enacted. The 1990 FCAA reaffirmed all existing ozone nonattainment areas by operation of law. As a result of this action, the Southeast Desert Modified Air Quality Maintenance Area (AQMA) remained nonattainment for ozone and was additionally classified as Severe-17. This nonattainment designation and classification set forth new attainment planning requirements for achieving the National Ambient Air Quality Standard (NAAQS) for ozone by November 15, 2007.

The 1990 FCAA set a new classification structure for ozone nonattainment areas. These areas were classified as Marginal, Moderate, Serious, Severe, Severe-17, and Extreme based on the severity of the nonattainment problem. Each classification requires States to submit various State Implementation Plan (SIP) revisions to meet new attainment planning requirements.

These areas are required to demonstrate **REASONABLE FURTHER PROGRESS** (RFP) and attainment of the ozone NAAQS by designated milestone dates. Milestone dates begin in the year 1996 and continue every 3 years thereafter. RFP and attainment are demonstrated by achieving incremental reductions of ozone precursor emissions [Volatile Organic Compounds (VOC) and Oxides of Nitrogen (NO<sub>x</sub>)], to reduce ozone concentrations in the ozone nonattainment area. These emission reductions are verified at each milestone date to demonstrate RFP until the ozone NAAQS is attained.

The California Air Resources Board (ARB) is the designated state air agency for California. ARB is responsible for incorporating local air quality planning agency's control strategy plans, rules, and regulations into the SIP for California. ARB is also responsible for submitting the SIP and subsequent revisions to the Environmental Protection Agency (EPA). **The Mojave Desert Air Quality Management District** (District) is the designated local air quality planning agency for the San Bernardino County portion of the Southeast Desert Air Basin (SEDAB) and Palo Verde Valley portion of Riverside County. The District is responsible for developing and implementing control strategy plans, rules, and regulations for this area. The District is also responsible for submitting these documents to ARB for incorporation into the SIP.

The 1990 FCAA includes two provisions for demonstrating RFP. One of the provisions affects ozone nonattainment areas classified Moderate to Extreme. These areas are required to develop a control strategy plan that provides for VOC reductions of at least 15 percent from the 1990 VOC emission levels. In addition, these reductions are required to offset any growth in VOC emissions occurring after 1990. These VOC reductions are required to be achieved no later than November 15, 1996. This control strategy plan was required to be submitted to EPA as a SIP revision on November 15, 1993. EPA guidance refers to this control strategy plan as the **Rate-of-Progress Plan (ROP)**.

The other RFP provision affects ozone nonattainment areas classified Serious to Extreme. These ozone nonattainment areas are required to develop a control strategy plan that provides for VOC reductions of at least 3 percent per year from the 1990 baseline emissions. These areas may also provide for NO<sub>x</sub> reductions, in addition to VOC reductions, to meet this requirement. These reductions are required to be achieved at least every 3 years from the 1996 milestone date to demonstrate RFP until the ozone NAAQS is attained. This control strategy plan is required to be submitted to EPA as a SIP revision by November 15, 1994. EPA guidance refers to this control strategy plan as the Post 1996 Attainment Demonstration and Reasonable Further Progress Plan (ADP).

As a Severe-17 nonattainment area, the District is required to comply with both ROP and ADP requirements. On January 25, 1994, the USEPA made a finding of non-submittal of the ROP Plan. Subsequently, the District's Governing Board adopted the ROP Plan on March 24, 1994, and submitted it to the USEPA. The USEPA finding of non-submittal initiated a time clock of one calendar year to find the ROP complete. This clock runs out on January 25, 1995. Since the Governing Board adoption of the ROP Plan, the planning assumptions have changed, which requires the District to revise the ROP. In addition, the District needed to adopt all ROP committal control measures to satisfy the completeness requirement.

**This document represents the District's "Revised ROP Plan".** It identifies and discusses: (1) the District's 1990 VOC and NO<sub>x</sub> baseline emission inventory; (2) the District's 1996 VOC and NO<sub>x</sub> forecasted emission inventory; (3) the District's 1996 VOC target level of emissions; (4) VOC and NO<sub>x</sub> emission budgets; (5) NO<sub>x</sub> substitution for required VOC reductions; (6) VOC emissions under the District's regulatory purview; (7) existing and proposed control measures used to achieve VOC and NO<sub>x</sub> reductions; and (8) proposed contingency measures to take effect in the event that the primary measures prove ineffective. This ROP Plan and its subsequent supporting rules and regulations will be submitted to ARB for incorporation into the SIP.

This plan will show that the District has exhausted all existing and proposed control technologies to achieve realistic VOC reductions from source categories under its regulatory purview. It will also show that the District has taken credit from all State and Federal programs that achieve actual VOC reductions by 1996. All of these efforts combined will achieve a 5.64 tons per day (tpd) VOC reduction by 1996, resulting in a 1.22 tpd shortfall. To make up this shortfall, the District is proposing NO<sub>x</sub> substitution. This NO<sub>x</sub> will come from NO<sub>x</sub> emission reductions required by District Rule 1160 - Internal Combustion Engines.

This ROP Plan provides narrative discussion regarding specific elements necessary to document the District's approach. In addition, this plan provides appendices that contain data to substantiate the narrative. Section I provides a description of the ozone non-attainment area. Section II provides details of the emission inventories. Section III provides details of VOC emissions availability. Section IV provides details on VOC reduction strategies. Section V provides details on contingency measures. Section VI provides details on emission budgets. Section VII provides details on the District's Rule adoption schedule. Section VIII provides a conclusion in narrative form. The appendices provide data that substantiates the District's approach.

## **I. DESCRIPTION OF THE OZONE NONATTAINMENT AREA**

The 1990 Federal Clean Air Act Amendments (FCAA) reaffirmed the Los Angeles-Anaheim-Riverside Consolidated Metropolitan Statistical Area (CMSA) nonattainment status for the ozone National Ambient Air Quality Standard (NAAQS) by operation of law. This CMSA includes Los Angeles, Orange, Ventura, Riverside, and San Bernardino counties. The SEDAB portion of this CMSA was classified as a Severe-17 ozone nonattainment area, based on a monitored ozone NAAQS violation in Banning, California. The United States Environmental Protection Agency (EPA) refers to the Severe-17 portion of the CMSA as the Southeast Desert Modified Air Quality Maintenance Area (AQMA). The District's portion of the Southeast Desert Modified AQMA covers about 40% of the District's entire geographic area. It includes a population of approximately 295,463 persons. Its boundaries encompass 7,440 square miles and is bordered by: (1) the South Coast Air Basin (SCAB) boundary and the Riverside County Line to the south; (2) the Los Angeles and Kern County lines to the west; (3) latitude 35° 10' N to the north; and (4) longitude 115° 45' W to the east (See Map I).

The District's meteorology is influenced by a moderately intense anticyclonic circulation, except during periods of frontal activity during the winter. On average, 20-30 frontal systems (ie. storms) move into the District each winter. During the summer, the District is generally influenced by a Pacific Subtropical High cell that sits off the coast of California.

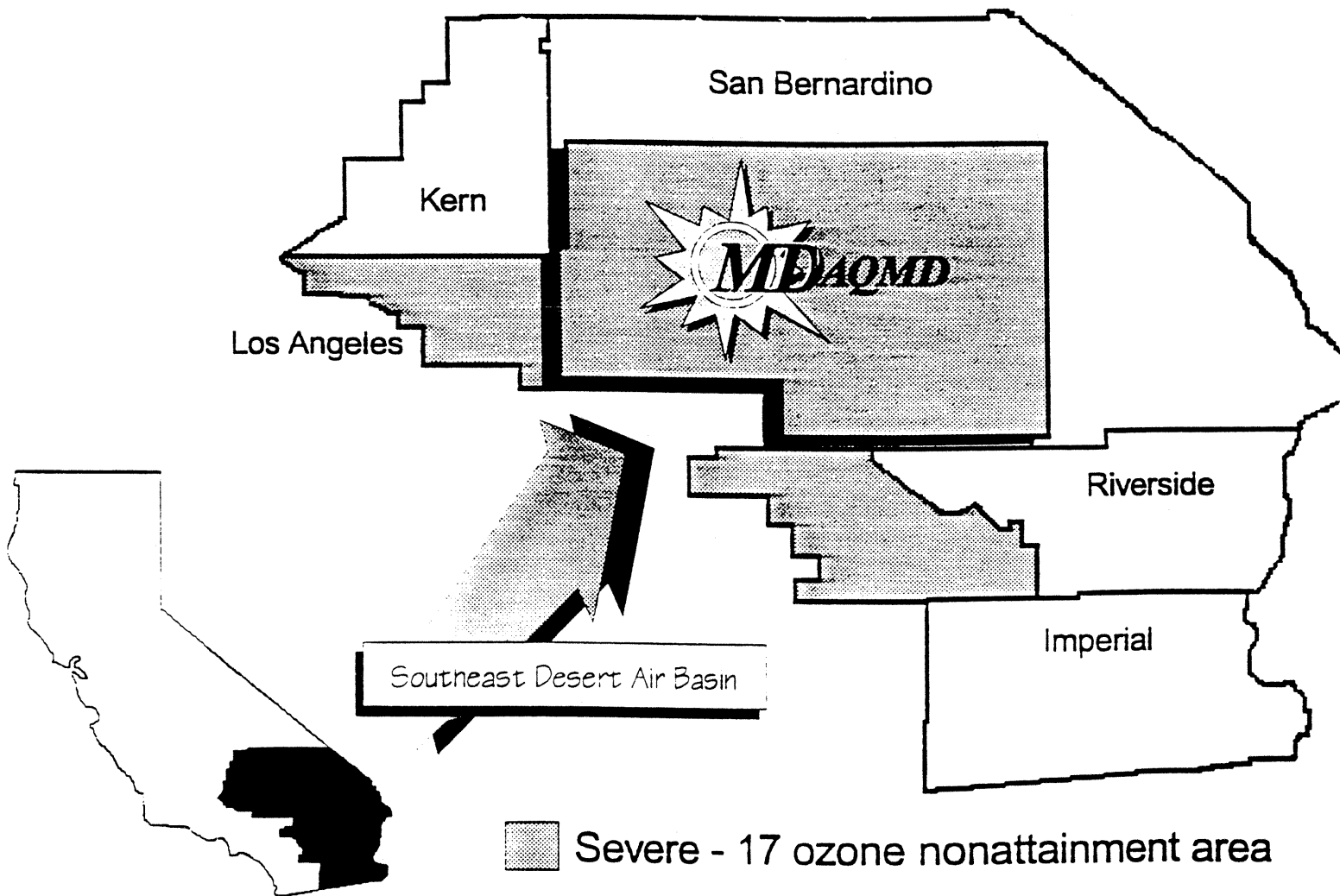
The District experiences high winds primarily from the south and west. The prevailing winds are predominantly from the south and west. These prevailing southwest winds provide a vehicle for a visible smog wall transported into the District from the SCAB through mountain passes. In addition, the rapid daytime heating of the lower air leads to convective activity. This exchange of upper air tends to accelerate surface winds during the warm part of the day when convection is at a minimum. During the winter the rapid cooling of the surface layers at night retards this exchange of momentum, which often results in calm winds.

The District is considered a dry environment. The summer average daily maximum temperature is 95°F. Temperatures average 58°-36°F in the winter months (November to January). As expected, the relative humidity is generally low.

The District's inversion conditions are much less favorable for the build-up of high pollutant concentrations than in the coastal areas of Southern California. When subsidence inversions occur they are generally 6,000 to 8,000 feet above the desert surface, allowing much greater vertical mixing than along the coast where the inversion base is often much lower.

MAP I

# Southeast Desert Air Quality Maintenance Area



## **II. EMISSION INVENTORIES**

The District has prepared several emission inventories to meet the 1990 FCAA RFP requirements. This section discusses these inventories. The discussion describes the purpose and components of each inventory. Most importantly, the emission inventories establish the foundation for achieving actual emission reductions to meet the 15 percent requirement.

The District has prepared: (a) a 1990 VOC and NO<sub>x</sub> Baseline Emission Inventory that quantifies the actual 1990 VOC and NO<sub>x</sub> emission levels; (b) a 1996 VOC and NO<sub>x</sub> Forecasted Emission Inventory adjusted for growth of existing uncontrolled VOC and NO<sub>x</sub> emissions; and (c) a 1996 VOC and NO<sub>x</sub> Emission Inventory target level assuming control measures in place. The following discussion describes each of these emission inventories in more detail.

### **a. 1990 VOC and NO<sub>x</sub> Baseline Emission Inventory**

The 1990 VOC and NO<sub>x</sub> Baseline Emission Inventory identifies all anthropogenic stationary, mobile and area sources in the District's portion of the federal ozone non-attainment area. It quantifies actual VOC and NO<sub>x</sub> emission levels generated by these sources in the year 1990. All required VOC and NO<sub>x</sub> reductions will be compared to the 1990 baseline emissions levels to demonstrate RFP.

The District's 1990 VOC Baseline Emission Inventory totals 46.50 tons per day (tpd). The emission inventory is comprised of: 67 stationary source categories (both major point and area sources), which total 16.96 tpd; 21 mobile source categories (both on-road and off-road sources), which total 26.53 tpd; and 11 miscellaneous area source categories (miscellaneous fugitives), which total 2.99 tpd (refer to Appendix A - Emission Inventory).

The District's 1990 NO<sub>x</sub> Baseline Emission Inventory totals 113.65 tpd. The emission inventory comprise 67 stationary source categories (both major point and area sources), which total 51.50 tpd; 21 mobile source categories (both on-road and off-road sources), which total 61.96 tpd; and 11 miscellaneous area source categories (miscellaneous fugitives), which total 0.17 tpd (refer to Appendix A - Emission Inventory).

### **b. 1996 VOC and NO<sub>x</sub> Forecasted Emission Inventory**

This inventory forecasts all future stationary, mobile, and area source emissions. It quantifies expected VOC and NO<sub>x</sub> emission levels in the year 1996. The 1990 baseline emission levels are forecasted to 1996 using various emission growth factors. The 1996 VOC and NO<sub>x</sub> Forecasted Emissions Inventories establish the future emission levels for achieving the required emission reductions.



The District's 1996 VOC Forecasted Emissions Inventory totals 43.20 tpd. This emission inventory comprise: 29 stationary source categories (both major point and area sources), which total 22.07 tpd; 14 mobile source categories (both on-road and off-road sources), which total 17.39 tpd; and 5 miscellaneous area source categories (miscellaneous fugitives), which total 3.74 tpd (refer to Appendix A - Emission Inventory Document).

The District's 1996 NO<sub>x</sub> Forecasted Emission Inventory totals 110.55 tpd. The inventory comprise 29 stationary source categories (both major point and area sources), which total 51.81 tpd; 14 mobile source categories (both on-road and off-road sources), which total 58.57 tpd; and 5 miscellaneous area source categories (miscellaneous fugitives), which total 0.17 tpd (refer to Appendix A - Emission Inventory).

**c. 1996 VOC and NO<sub>x</sub> Emission Inventory Target Levels**

The 1996 VOC and NO<sub>x</sub> Emission Inventory Target Levels represent the 1996 VOC and NO<sub>x</sub> emission levels with control measures in place. The 1996 target levels establishes the goal for achieving actual emission reductions in 1996.

The District's 1996 VOC Emission Inventory Target Level is 36.34 tpd. This target is determined by adding the calculated 15 percent VOC reduction (6.41 tpd) from the 1990 VOC Adjusted Emission Inventory to the calculated VOC reduction from the Federal Motor Vehicle Control Program (FMVCP) and Federal Reid Vapor Pressure (FRVP) regulations (3.75 tpd), subtracted from the 1990 baseline emission levels (See Figure I). The District is required to reduce it's 1990 VOC Baseline Emission Inventory by 10.16 tpd to meet the 1996 VOC Emission Inventory Target Level. However, since the District's 1996 forecasted VOC emission levels decline to 43.20 tpd, the District's true reduction burden is 6.86 tpd to meet the 1996 VOC target level. **Therefore, all control efforts have been aimed at meeting this 6.86 tpd requirement.**

The District will use NO<sub>x</sub> reductions in addition to VOC reductions to meet the 1996 VOC target level. Therefore, the District is required to establish a 1996 NO<sub>x</sub> target level, which is calculated similar to the 1996 VOC target level (see Figure II). The District is not required to reduce it's 1990 NO<sub>x</sub> Baseline Emission Inventory to meet the 1996 NO<sub>x</sub> Emission Inventory Target Level, because the NO<sub>x</sub> target level emissions are higher than the nonattainment area 1996 NO<sub>x</sub> emission levels. Therefore, the District does not face any required NO<sub>x</sub> reductions.

# FIGURE I

**Figure I**

**Mojave Desert AQMD**

**Revised Rate-Of-Progress Calculation and Reductions**

(all emissions in tons per day VOC)

1. *1990 Baseline Emission Inventory*  
 Total AQMA Emissions in 1990:  
     46.50            tpd VOC
  
2. *Calculate 1990 Adjusted Baseline Emission Inventory*  
 (Subtract FMVCP and FRVP reductions)  
     46.50            -            3.75            =            42.75
  
3. *Calculate 15 Percent Emission Reduction from 1990 Adjusted Baseline*  
     42.75            x            0.15            =            6.41
  
4. *Calculate 1996 Emission Reduction Target*  
 Total 15 percent reduction, FMVCP/FRVP reduction, RACT fix-ups, and I&M reduction:  
     6.41            -            3.75            -            0.00            =            10.16
  
5. *Calculate 1996 Target Level of Emissions*  
 Total 1990 emissions less Total Required Emission Reductions:  
     46.50            -            10.16            =            36.34  
 (this equates to a 22% reduction.)

Year	1990	1996
<i>Baseline:</i>	46.50	Forecast: 43.20
		Target: 36.34
Required Reduction:		6.86

# FIGURE II

# Figure II

## Mojave Desert AQMD

### Revised Rate-Of-Progress NOx Calculations

(all emissions in tons per ozone seasonal day)

- 1. 1990 Baseline NOx Emission Inventory**

Total NOx Emissions in 1990:

113.65	tpd			
--------	-----	--	--	--
- 2. Calculate 1990 Adjusted Baseline NOx Emission Inventory**

(Subtract FMVCP and FRVP reductions)

113.65	-	3.30	=	116.95
--------	---	------	---	--------
- 3. Calculate 15 Percent Emission Reduction from 1990 Adjusted Baseline**

116.95	x	0.00	=	0.00
--------	---	------	---	------
- 4. Calculate 1996 NOx Emission Reduction Target**

Total 15 percent reduction, FMVCP/FRVP reduction, RACT fix-ups, and I&M reduction:

0.00	+	3.30	-	0.00	=	-3.30
------	---	------	---	------	---	-------
- 5. Calculate 1996 Target Level of NOx Emissions**

Total 1990 emissions less Total Required Emission Reductions:

113.65	-	3.30	=	116.95
--------	---	------	---	--------

Year	1990	1996
NOx Baseline:	113.65	NOx Forecast: 110.55
		NOx Target: 116.95
Required NOx Reduction:		0.00
- 6. Calculate NOx Substitution Equivalence Ratio**

Equivalent ratio is adj. NOx baseline divided by adj. VOC baseline:

116.95	/	42.75	=	2.74
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- 7. Calculate Required NOx Substitution Reductions**

Required NOx is VOC shortfall multiplied by equivalence ratio:

1.22	x	2.74	=	3.34
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### **III. VOC EMISSIONS AVAILABILITY**

This section discusses the ROP Plan's strategy for achieving realistic VOC reductions by 1996. The discussion describes the composition of the District's 1996 VOC Forecasted Emission Inventory.

As discussed in Section II, the District is required to achieve a 6.86 tpd VOC reduction to meet the 1996 VOC target level. The following discussion depicts a realistic estimate of the available VOC emissions that can be feasibly reduced.

#### **a. Source Categories Considered Controllable**

The stationary source VOC inventory includes traditional point and area sources under the District's regulatory purview. The mobile source VOC inventory includes on-road and off-road mobile sources under ARB's and EPA's regulatory purview. The miscellaneous area source VOC inventory includes fugitive emissions under ARB's regulatory purview (refer to Appendix A - Emission Inventory).

The District's control measure activities are generally limited to VOC emissions generated by traditional stationary sources. However, the majority of the individual stationary source categories each generate less than 25 tons per year (tpy) of VOC emissions, which provide little opportunity for achieving significant VOC reductions. Some of the individual major stationary source categories generating more than 25 tpy are already using the best available control technology (BACT) to control their VOC emissions. A large portion of the stationary source categories are uncontrolled, because existing VOC control technology is not available for their industry. All of these factors reduce the District's pool of available VOC emissions for achieving actual VOC reductions by 1996 (refer to Appendix A - Emission Inventory).

##### a.1 Stationary Sources

By 1996, stationary source VOC emissions are forecasted to generate 22.07 tpd from 29 stationary source categories. However, only sources forecasted to generate 13.51 tpd of these emissions are considered controllable (See Figure III).

Out of 29 stationary source categories, the District cannot feasibly achieve reductions from 26. Of these 26, twelve (12) are already using BACT, and are forecasted to generate 6.05 tpd in 1996. Eight (8) categories each generate less than 0.005 tpd of VOC emissions. Six (6) are also not controlled, because existing VOC control technology is not feasible for their facility. These 6 stationary source categories are forecasted to generate 2.51 tpd in 1996 (refer to Appendix A - Emission Inventory).

##### a.2 Mobile Sources

By 1996, mobile source VOC emissions are forecasted to generate 17.39 tpd from 14 mobile source categories (see Figure III).

None of these mobile source categories are under the District's direct regulatory purview. ARB and EPA have regulatory authority for control of mobile source emissions. However, the District has indirect regulatory authority to implement behavior-based transportation control measures (TCMs) for on-road mobile sources. The District can take credit for VOC reductions resulting from any State and Federal mobile source control program, except for the FMVCP and FRVP regulations, to meet the 1996 target level of emission (refer to Appendix A - Emission Inventory).

### a.3 Miscellaneous Area Sources

The miscellaneous area source VOC inventory identifies 5 miscellaneous area source categories which are forecasted to generate a total of 3.74 tpd in 1996 (see Figure III). None of the miscellaneous area source categories are under the District's regulatory purview. ARB has regulatory authority for control of the miscellaneous area source emissions, except for wildfire and structural fire emissions. The District can take credit for VOC reductions resulting from any State miscellaneous area source control program to meet the 1996 target level of emission (refer to Appendix A - Emission Inventory).

1996 Forecasted VOC Inventory Pools

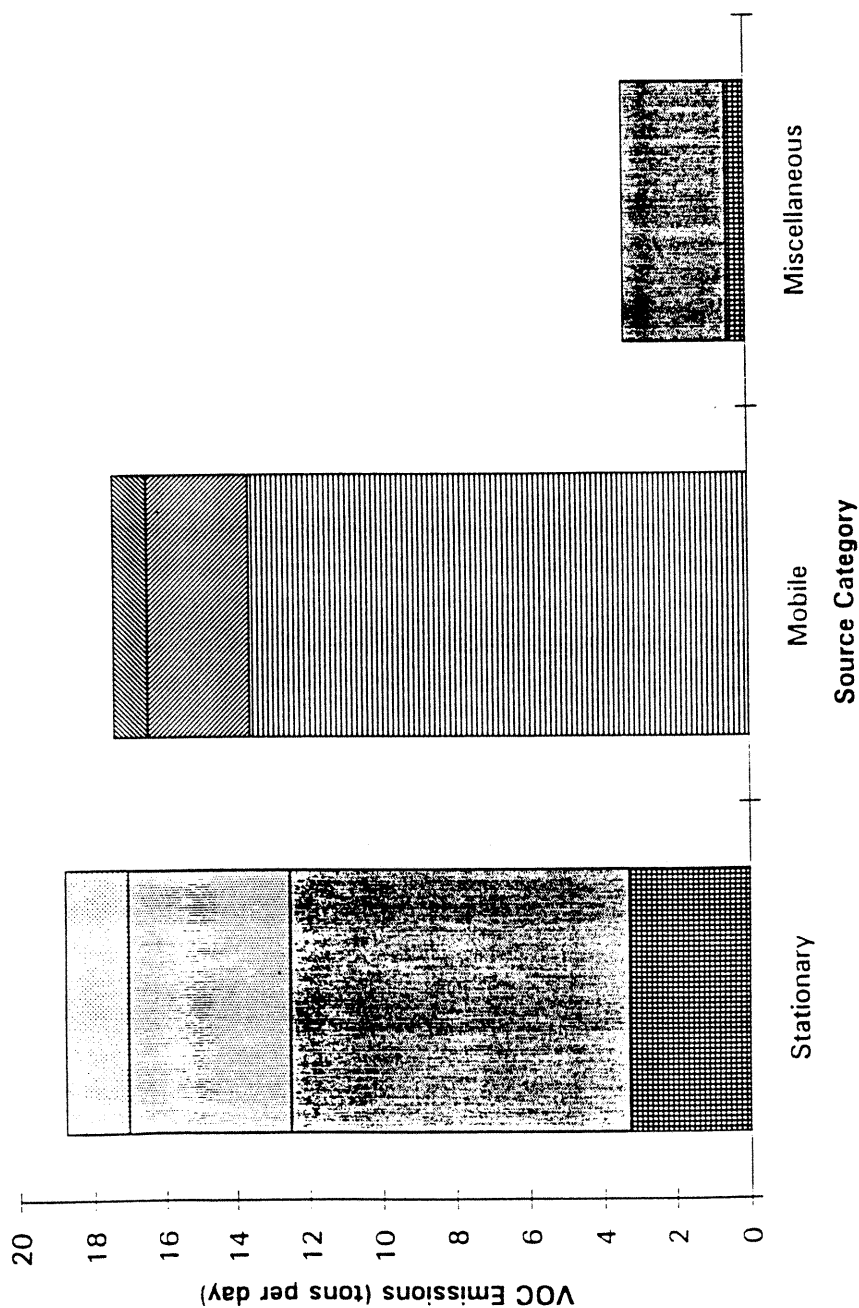
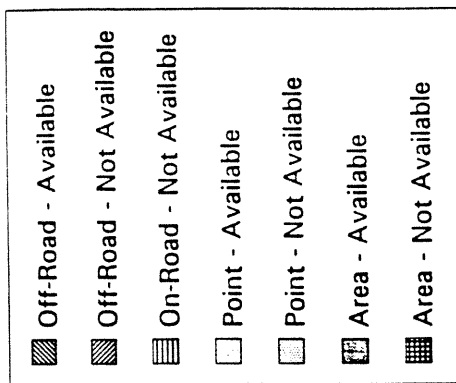


FIGURE III



# 1996 Projected Reductions

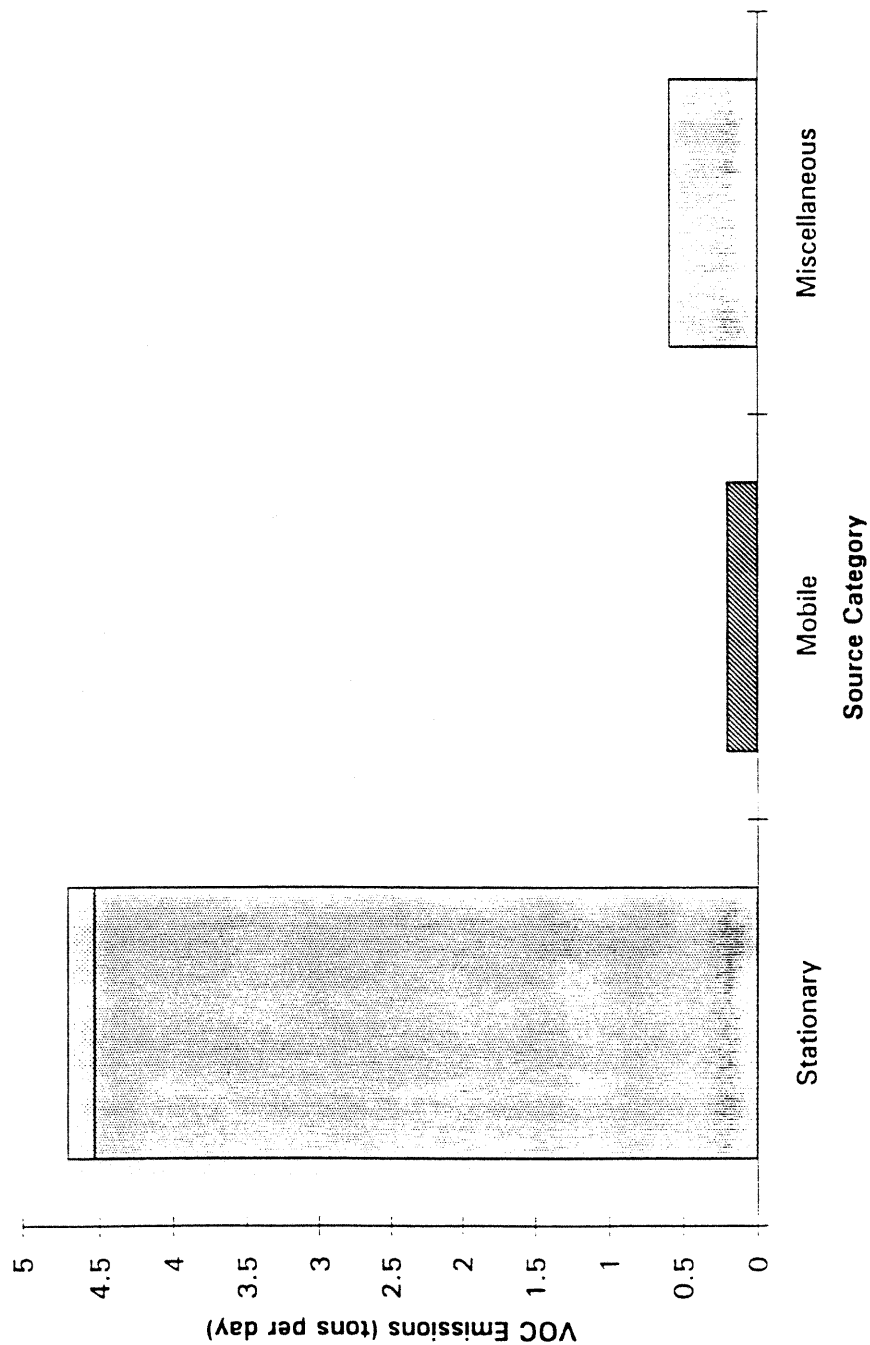
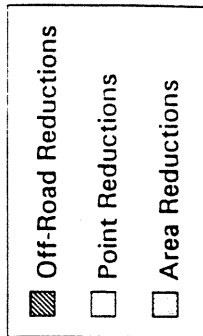


FIGURE IV



## IV. REDUCTION STRATEGIES

This section discusses VOC reduction strategies. The discussion describes existing and proposed control methods to achieve actual VOC reductions from the 1996 VOC Forecasted Emission Inventory. The analysis depicts actual VOC reductions that can be achieved by applying existing control technologies to specific source categories.

The District has identified several control methods and State programs that can achieve an actual 5.64 tpd VOC reduction by 1996 (see Figure IV). As previously discussed, the District is required to achieve a 6.86 tpd reduction. The District proposes NO<sub>x</sub> substitution from NO<sub>x</sub> control measures to make up the 1.22 tpd ozone precursor shortfall. The following discussion identifies and describes each control measure.

### a. Stationary Source Control Measures

Stationary sources emitting a combined total of 13.51 tpd provide an opportunity for reduction. These VOC emissions are generated by Natural Gas Internal Combustion (IC) Engines, Architectural Coatings/Related Products and Retail Gasoline Service Stations. The District has identified stationary source control methods that can achieve a 4.84 tpd VOC reduction from these stationary source categories (refer to Appendix B - Control Measures).

#### a.1 Natural Gas Internal Combustion Engines

By 1996, Natural Gas IC Engines are forecasted to generate 1.25 tpd of VOC and 13.84 tpd of NO<sub>x</sub> emissions. The District expects to achieve a 0.18 tpd VOC reduction and 4.86 tpd NO<sub>x</sub> reduction from Natural Gas IC Engines by 1996. The District's IC Engine control method will achieve an overall 14 percent VOC reduction and a 35 percent NO<sub>x</sub> reduction from the Natural Gas IC Engine source categories (refer to Appendix B - Control Measures).

The District proposes to modify existing District Rule 1160, which is proposed to apply the Rule to any stationary IC engine rated at 500 or more brake horsepower.

- The proposed Amendments to District Rule 1160 are scheduled for adoption on October 26, 1994 (see Rule Adoption Schedule in Section VII).

#### a.2 Architectural Coatings/Related Products

By 1996, Architectural Coatings/Related Products are forecasted to generate 7.45 tpd of VOC emissions. The District expects to achieve a 0.92 tpd VOC reduction from Architectural Coatings/Related Products by 1996. The District's architectural coating rule is achieving an overall 12 percent VOC reduction from the Architectural Coating and Thinner source category (refer to Appendix B - Control Measures).

The District has adopted District Rule 1113 to establish VOC emission limits on architectural coating products. Rule 1113 applies to any person who supplies, sells, offers for sale, applies or solicits the application of any architectural coating.

- Modification of the existing District rule to achieve the anticipated reduction is not necessary.

### a.3 Gasoline Service Stations

By 1996, Gasoline Service Stations are forecasted to generate 4.73 tpd of VOC emissions. The District expects to achieve a 3.74 tpd VOC reduction from Gasoline Service Stations by 1996. The District's Stage II vapor control methods will achieve an overall 79 percent VOC reduction from the Gasoline Service Stations source category (refer to Appendix B - Control Measures).

The District has adopted District Rule 461 to establish a VOC emission limit from the transfer and marketing of gasoline; and the storage, transfer, and dispensing of gasoline. Rule 461 applies to bulk facilities, retail service stations, the transport of fuels between these facilities, and the transfer of fuels into motor vehicle tanks.

- Modification of the existing District rule to achieve the anticipated reduction is not necessary.

### **b. Mobile Source Control Measures**

The District has indirect regulatory authority to implement behavior-based Transportation Control Measures (TCMs) to encourage alternative modes of transportation. However, TCM emission reductions are difficult to quantify and enforce. The District believes that implementing TCMs in the federal ozone nonattainment area will not achieve actual VOC reductions to meet the 1996 target level of emission (refer to Appendix B - Control Measures).

ARB and EPA have regulatory authority for control of mobile source emissions. The District can take credit for VOC reductions from State mobile source control programs. The District has identified State programs that can achieve a 0.21 tpd VOC reduction from the Off-Road Diesel Heavy Duty Equipment, Commercial Lawn and Garden Equipment, and Residential Lawn and Garden Equipment source categories by 1996.

#### b.1 Off-Road Heavy Duty Diesel Equipment

By 1996, Off-Road Heavy Duty Diesel Equipment are forecasted to generate 0.62 tpd of VOC emissions and 6.17 tpd of NO<sub>x</sub> emissions. The State Heavy Duty Diesel Equipment program is expected to achieve a 0.12 tpd VOC reduction and 0.31 tpd NO<sub>x</sub> reduction from the Off-Road Heavy Duty Diesel Equipment source category by 1996. The State Heavy Duty Diesel Equipment program will achieve an overall 20 percent VOC reduction and 5 percent NO<sub>x</sub> reduction from the Off-Road Heavy Duty Diesel Equipment source categories (refer to Appendix B - Control Measures).

- No rule development action required by the District.



## b.2 Lawn and Garden Equipment

By 1996, Lawn and Garden Equipment are forecasted to generate 0.32 tpd of VOC emissions. The State Lawn and Garden Utility Equipment program is expected to achieve a 0.09 tpd VOC reduction from the Commercial Lawn and Garden Equipment and Residential Lawn and Garden Equipment source categories by 1996. The State Lawn and Garden program will achieve an overall 28 percent VOC reduction from the Lawn and Garden Equipment source categories (refer to Appendix B - Control Measures).

- No rule development action required by the District.

## **c. Miscellaneous Area Source Control Measures**

ARB has regulatory authority for control of miscellaneous area source emissions. The District can take credit for VOC reductions from State miscellaneous area source control programs. These categories are forecasted to generate 3.38 tpd of VOC emissions by 1996. The District has identified a State Consumer Products program that can achieve a 0.59 tpd VOC reduction from the Consumer Products source categories by 1996. This State program is expected to achieve an overall 18 percent VOC reduction from the Consumer Products source categories (refer to Appendix B - Control Measures).

- No rule development action required by the District.

## **d. NO<sub>x</sub> Substitution**

The District proposes to substitute a portion of NO<sub>x</sub> reductions to make-up any VOC reduction shortfall in meeting the 1996 VOC target level. EPA guidance requires NO<sub>x</sub> to be substituted at the same ratio as the 1990 Adjusted Baseline Emission Inventory (116.95 tpd of NO<sub>x</sub> to 42.75 tpd of VOC). This equates to a 2.74 tpd NO<sub>x</sub> reduction for each tpd of VOC reduction shortfall. Several of the District control measures will achieve 5.17 tpd of NO<sub>x</sub> emission reductions by 1996. The District will substitute 3.33 tpd of NO<sub>x</sub> reductions required by District Rule 1160 - Internal Combustion Engines (refer to Figure II, page 8).

## V. CONTINGENCY MEASURES

This section discusses the ROP Plan's contingency measures that will take effect in the event that the primary measures fall short of the goal. The District is required to develop and implement contingency measures that achieve VOC reductions by November 15, 1997. These contingency measures are required to achieve at least a 3% tpd reduction from the 1990 emission levels (57 Federal Register 13498 published April 16, 1992). This equates to a 1.3 tpd VOC reduction.

### a. Mobile Sources

ARB and EPA have regulatory authority for control of mobile source emissions. The District can take credit for VOC reductions from State and Federal control programs and apply them toward the contingency requirements. The District has identified a State program that can achieve a 1.51 tpd VOC reduction from the On-Road Light Duty Passenger Vehicle, and On-Road Light and Medium Duty Trucks source categories by 1997.

#### a.1 On-Road Light and Medium Duty Vehicles

By 1996, On-Road Light and Medium Duty Vehicles are forecasted to generate 10.87 tpd of VOC emissions. The proposed State Enhanced I&M Program is expected to achieve 1.51 tpd VOC reduction from the On-Road Light Duty Passenger and On-Road Light and Medium Duty Truck source categories by 1997. Currently, this program and the Federal Enhanced I&M program are centered in legal controversy, as well as technical controversy. It is anticipated that by 1996 issues surrounding "Enhanced I&M" will be resolved. The District proposes the State's version of Enhanced I&M as a contingency measure.

- No rule development action required by the District.

## VI. CONFORMITY EMISSION BUDGETS

This section discusses the ROP Plan's VOC and NO<sub>x</sub> emission budgets. The discussion describes the 1996 VOC and NO<sub>x</sub> emission levels for on-road mobile sources. The analysis establishes the basis for making conformity determinations for federally funded and/or approved projects, plans, or programs in the federal ozone nonattainment area.

As discussed in Section IV, the District does not expect to achieve any VOC or NO<sub>x</sub> reductions from on-road mobile sources by 1996. The emission budgets are intended to ensure that VOC and NO<sub>x</sub> emissions generated by transportation proposed projects, plans, or programs will not inhibit the District's ability to achieve actual emission reductions by 1996.

The following emission budgets only apply to federal conformity determinations made between 1990 and 1996.

### a. 1996 General Development Emission Budgets

EPA has not released guidance for establishing General Development emission budgets. The District's ROP Plan will not include an emissions budget for General Development plans, programs, or projects. The District will revise the ROP Plan to include General Development VOC and NO<sub>x</sub> emission budgets when EPA guidance is available.

### b. 1996 Transportation Emission Budgets

The Mobile Source VOC and NO<sub>x</sub> Emission Inventory is comprised of 6 on-road mobile source categories which are forecasted to generate 13.56 tpd of VOC emissions and 26.21 tpd of NO<sub>x</sub> emissions in 1996. The District expects to achieve a 0.98 tpd VOC reduction from the on-road mobile source categories by 1996. On-road mobile sources should not exceed these emission levels in 1996 to ensure that the District achieves the required emissions reductions. The Transportation emission budgets are as follows:

On-Road Mobile Sources Emission Budgets		
	1996 NO <sub>x</sub>	1996 VOC.
On-Road Light Duty Passenger Vehicles	6.32 tpd	7.83 tpd
On-Road Light Duty Trucks	2.12 tpd	2.07 tpd
On-Road Medium Duty Trucks	1.32 tpd	0.97 tpd
On-Road Heavy Duty Diesel Trucks	12.98 tpd	1.84 tpd
On-Road Heavy Duty Gasoline Trucks	3.42 tpd	0.73 tpd
On-Road Motorcycles	0.05 tpd	0.12 tpd
The 1996 Transportation Emission Budgets =	26.21 tpd	13.56 tpd

## VII. VOC RULE ADOPTION SCHEDULE

This section discusses the ROP Plan's VOC rule adoption schedule. The discussion describes the status of VOC rules and their adoption date. All of these VOC rules will be submitted as SIP revisions. The District rule adoption schedule is as follows:

District VOC Rules		
<u>Rules</u>	<u>Status</u>	<u>SIP Submittal</u>
Rule 461 (Gasoline Transfer and Dispensing)	Existing	Nov. 2, 1992
Rule 1113 (Architectural Coatings)	Existing	Nov. 2, 1992
Rule 1160 (Internal Combustion Engines)	Modification	Oct. 26, 1994

## VIII. CONCLUSION

In conclusion, the District reiterates that it has exhausted all VOC control measures to achieve actual VOC reductions from sources under its regulatory purview. Even with these efforts, a 1.22 tpd VOC reduction shortfall will occur. The District believes that a cooperative regulatory effort between the various Federal, State, and local air pollution control agencies will allow NO<sub>x</sub> reductions to be substituted to make up the shortfall. However, the District believes that if it could delete all VOC sources under its purview, a reduction in the design value (Banning) would not occur.

This is so for two specific reasons: one is that Banning is located in an area geographically and atmospherically isolated from the Mojave Desert AQMD; secondly, evidence supports that the Banning violation was caused by transported pollution from the SCAB (i.e., reducing ozone precursors in Banning would have no effect on the design value).

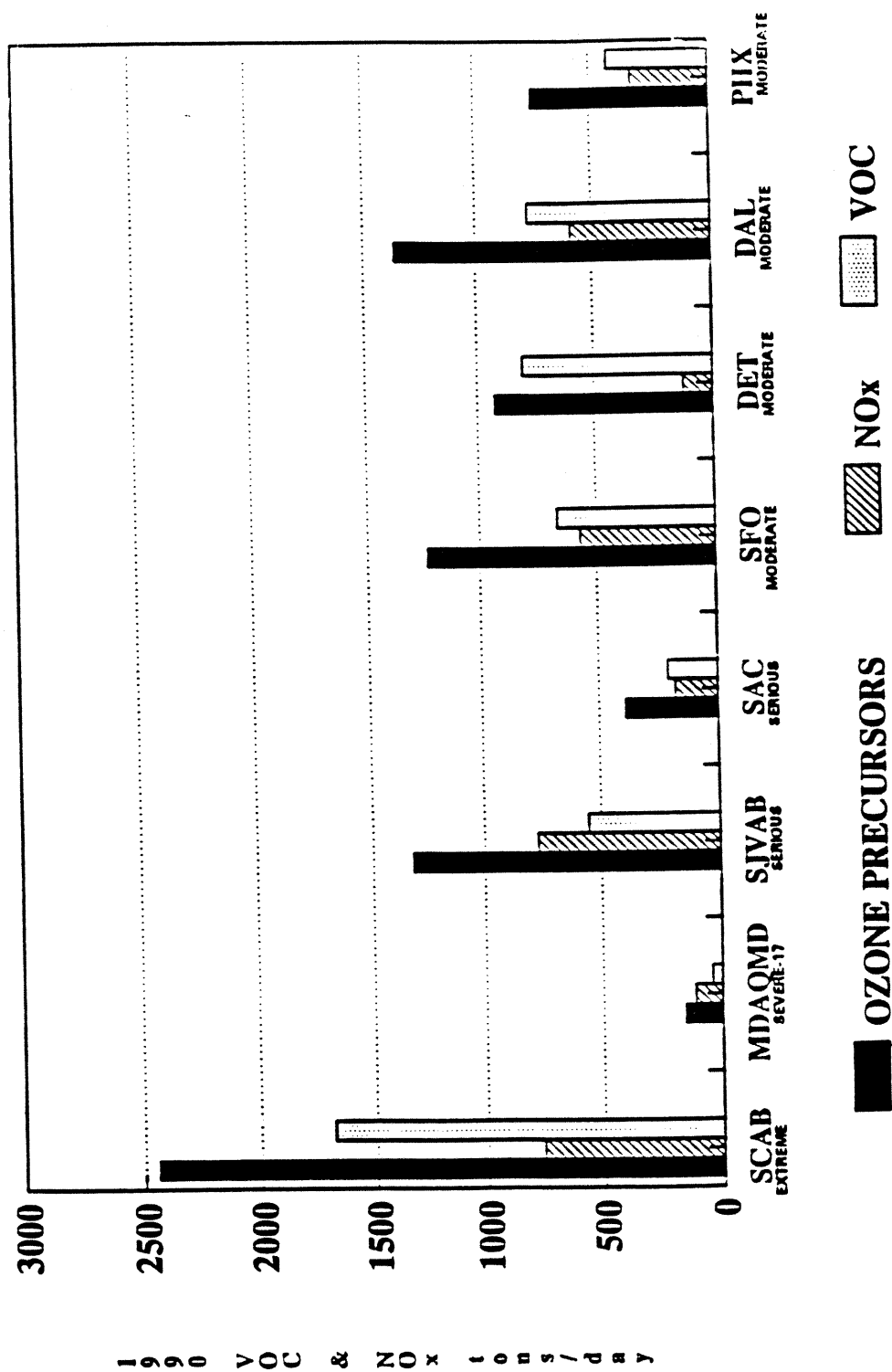
As we know, the Federal methodology pertaining to nonattainment designation activities require that specific assumptions be made. Unfortunately, these assumptions can and do compromise the design of the Federal Clean Air Act. The following are examples of these assumptions:

- No recognition of transported pollution on downwind Districts.
- Inadequate analysis regarding relationship between the documented inventory and the design value.
- No credence given to geographic and atmospheric conditions.
- Inadequate analysis of the interstate mobile source contribution.

In closing, the District concludes that the sources under its regulatory purview do not contribute and are not capable of supporting an exceedance of the NAAQS for ozone (see Figure V).

FIGURE V

# COMPARISON: EMISSION INVENTORY AND CLASSIFICATION



OZONE PRECURSORS = NOx + VOC

## **APPENDIX A**

### **EMISSION INVENTORY**

# VOC and NOx Emission Inventory

## Technical Document

### I. INTRODUCTION

This document presents the Emission Inventory for the Revised Rate-Of-Progress Plan (ROP), covering the Mojave Desert Air Quality Management District's Federal ozone nonattainment area (San Bernardino County portion of the Southeast Desert Modified Air Quality Management Area). This inventory serves as the basis for the planning assumptions, forecasts and strategies presented in the ROP. The inventory tabulates volatile organic compound (VOC), oxides of nitrogen (NOx), and carbon monoxide (CO) emissions from all anthropogenic sources within the District federal ozone nonattainment area. CO emissions are not involved in the ozone planning process, and are included for informational purposes only. Emissions are estimated for a typical day during the ozone season (June through August). Attachment A contains a summary of the emission inventory.

### II. PRESENTATION FORMAT

Sources are presented in four groups: stationary point sources, stationary area sources, mobile sources, and miscellaneous area sources. Within each group, sources are organized by industry or activity type as categories. VOC, NOx and CO emissions are totalled for each category in tons per ozone seasonal day, tons per average annual day, and tons per year. Standard Industrial Classification (SIC) codes, Source Classification Codes (SCCs), and Emission Inventory Code (EIC) numbers are given for each category when known. These codes and numbers identify industry, activity and process, and may not accurately represent each facility. The emission data is presented individually in tabular format with category totals. Additional information is presented that discusses emissions data sources and emissions data calculation methods.



### III. EMISSION SOURCE GROUPS

#### a. STATIONARY POINT SOURCES

For the purposes of this document, Stationary Point Sources are typically large-scale, fixed facilities or operations with significant District-permitted equipment. Each District facility submits an annual criteria emission inventory that details emissions, activity rates and emission factors. These criteria emission inventory submissions were the primary data and methodology used for point sources.

##### **Category: Chemical Milling - Etching**

	VOC	NOx	CO	
Total Emissions:	0.04	0.02	0.00	(tons per ozone seasonal day)
	0.04	0.02	0.00	(tons per average annual day)
	15.60	9.00	1.20	(tons per year)

SIC 3728 (Aircraft Parts and Auxiliary Equipment)

Primary SCC 3-09-015-01 (Milling Tank)

Chemical Milling - Etching is composed of a single facility:

Facility Name/Location	VOC	NOx	CO
<b>Aerochem/El Mirage</b>			
Storage Tank	5.64	0.00	0.00
Maskant Coater	9.78	0.00	0.00
Two Natural Gas Boilers	0.18	9.00	1.20
<b>Category Totals (tons per year):</b>	<b>15.60</b>	<b>9.00</b>	<b>1.20</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using emission factors. Activity levels were provided by facilities.

##### **Category: Flat Glass Manufacturing**

	VOC	NOx	CO	
Total Emissions:	0.01	2.16	0.03	(tons per ozone seasonal day)
	0.01	2.16	0.03	(tons per average annual day)
	3.83	786.98	10.13	(tons per year)

SIC 3211 (Flat Glass Manufacturing)

Primary SCC 3-05-014-03 (Flat Glass Melting Furnace)

Flat Glass Manufacturing is composed of a single facility:

Facility Name/Location	VOC	NOx	CO
AFG/Victorville			
Natural Gas Furnace	3.31	784.25	9.54
Diesel IC Engine	0.09	1.65	0.36
Diesel Vehicles	0.06	1.08	0.23
Coating Fugitives	0.37	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>3.83</b>	<b>786.98</b>	<b>10.13</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using furnace source tests and emission factors for other sources. Activity levels were provided by AFG.

**Category: Concrete Batch and Asphalt Plants**

	VOC	NOx	CO	
Total Emissions:	0.00	0.04	0.01	(tons per ozone seasonal day)
	0.00	0.04	0.01	(tons per average annual day)
	0.94	15.29	4.81	(tons per year)

SIC 1422 (Crushed and Broken Limestone)

SIC 2951 (Asphalt Paving Mixtures and Blocks)

SIC 3273 (Ready-Mixed Concrete)

Concrete Batch and Asphalt Plants is composed of the following five facilities:

Facility Name/Location	VOC	NOx	CO
Agcon/Oro Grande			
Diesel Mobile Equipment	0.15	2.81	0.61
Boral Resources, Inc./Several Facilities			
Two Asphalt Plants	0.07	1.99	0.40
Two Asphalt Storage Tanks	0.01	0.28	0.07
Screening Plant	0.01	0.15	0.03
Three Internal Combustion Engines	0.34	4.80	0.51
Three Front End Loaders	0.22	3.55	0.82
Industrial Asphalt/Oro Grande			
Natural Gas Asphalt Plant	0.10	1.40	2.30
Victor Valley Ready Mix/Hesperia			
Diesel Mobile Equipment	0.02	0.31	0.07
Wilde Horse/Barstow			
Aggregate Circuit	0.02	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>0.94</b>	<b>15.29</b>	<b>4.81</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using equipment-specific emission factors. Activity levels were provided by facilities.

**Category: General Aviation**

	VOC	NOx	CO	
Total Emissions:	0.07	0.02	4.08	(tons per ozone seasonal day)
	0.07	0.02	4.08	(tons per average annual day)
	27.31	5.98	1490.97	(tons per year)

SIC 4581 (Airports, Flying Fields, and Airport Terminal Services)

General Aviation is composed of four facilities:

Facility Name/Location	VOC	NOx	CO
Apple Valley Airport/Apple Valley			
Single and Multiple Piston Aircraft	8.86	1.87	486.77
Barstow-Daggett Airport/Daggett	8.86	1.87	486.77
Hesperia Airport/Hesperia	8.86	1.87	486.77
Twentynine Palms Airport/Twentynine Palms	0.73	0.37	30.66
<b>Category Totals (tons per year):</b>	<b>27.31</b>	<b>5.98</b>	<b>1490.97</b>

Emission information was obtained from the Apple Valley Airport Improvements Draft Environmental Impact Report (P&D Technologies, February 1992) and does not represent all general aviation activity District-wide (additional information will be added as it becomes available); in addition, aircraft refueling operations emissions information will be added as information becomes available. Emissions were estimated using EPA aircraft emission factors. Aircraft activity levels were derived from historical Apple Valley Airport activity records.

**Category: Railroad Depot**

	VOC	NOx	CO	
Total Emissions:	0.05	0.03	0.10	(tons per ozone seasonal day)
	0.05	0.03	0.10	(tons per average annual day)
	17.07	10.41	37.90	(tons per year)

SIC 4013 (Railroad Switching)

Railroad Depot is composed of a single facility:

Facility Name/Location	VOC	NOx	CO
Atchison, Topeka & Santa Fe/Barstow			
Wastewater Treatment	0.32	0.00	0.00

Diesel Test Stand	0.10	7.80	3.50
Two Gasoline Storage Tanks	0.01	0.00	0.00
Eight Diesel Storage Tanks	3.69	0.00	0.00
Three Waste Oil Storage Tanks	0.92	0.00	0.00
Gasoline Mobile Equipment	3.05	1.28	33.54
Diesel Mobile Equipment	0.16	1.33	0.86
Coater	2.88	0.00	0.00
Toluene Storage Tank	0.96	0.00	0.00
Fiberglass	4.98	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>17.07</b>	<b>10.41</b>	<b>37.90</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using emission factors. Activity levels were provided by the facility.

**Category: Public Wastewater Treatment Plants**

	VOC	NOx	CO	
Total Emissions:	0.00	0.11	0.02	(tons per ozone seasonal day)
	0.00	0.11	0.02	(tons per average annual day)
	0.60	39.47	8.79	(tons per year)

**SIC 4952 (Sewerage Systems)**

Public Wastewater Treatment Plants is composed of the following two facilities:

Facility Name/Location	VOC	NOx	CO
<b>Barstow Wastewater Treatment Plant/Barstow</b>			
Natural Gas IC Engine	0.19	37.90	4.79
Two Emergency Generators	0.00	0.18	0.02
Sewage Sludge Incinerator	0.01	0.13	0.17
Diesel Incinerator	0.00	0.02	0.00
Natural Gas Space Heating	0.00	0.04	0.01
Cleaning/Degreasing Fugitives	0.12	0.00	0.00
<b>Victor Valley Wastewater Reclamation Authority/Victorville</b>			
Digester Gas Flare	0.02	0.18	0.59
Digester Gas and Natural Gas IC Engine	0.09	1.02	3.21
Primary and Secondary Wastewater Treatment	0.18	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>0.60</b>	<b>39.47</b>	<b>8.79</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using equipment-specific emission factors. Activity levels were provided by facilities.

**Category: Mineral Mining**

	VOC	NOx	CO	
Total Emissions:	0.03	0.38	0.21	(tons per ozone seasonal day)
	0.03	0.38	0.21	(tons per average annual day)
	11.19	137.44	74.88	(tons per year)

SIC 1099 (Metal Ore Mining)

SIC 1422 (Crushed and Broken Limestone Mining)

SIC 1453 (Fire Clay Mining)

SIC 1499 (Miscellaneous Non-metallic Mineral Mining)

SIC 3295 (Ground or Treated Minerals Manufacturing)

Mineral Mining is composed of the following 10 facilities:

Facility Name/Location	VOC	NOx	CO
<b>Brubaker-Mann/Barstow</b>			
Diesel IC Engine	0.28	5.32	1.16
<b>CalWest Rock/Newberry Springs</b>			
Diesel Mobile Equipment	1.32	25.35	5.51
Gasoline Mobile Equipment	0.59	0.42	16.13
<b>Crystal Hills Sand &amp; Gravel/Lucerne Valley</b>			
Diesel Mobile Equipment	0.54	0.01	2.25
<b>Partin Limestone/Lucerne Valley</b>			
Four Diesel IC Engines	0.33	6.44	1.40
Diesel Mobile Equipment	0.90	17.36	3.77
Gasoline Mobile Equipment	0.30	0.21	8.22
<b>Pluess-Staufner/Lucerne Valley</b>			
Natural Gas/Oil Heater	0.00	0.16	0.04
Oil Heater	0.00	0.16	0.04
Heat Exchanger	0.00	0.10	0.02
Two IC Engine Generator Sets	0.04	1.47	0.28
Non-retail Gasoline Dispensing	0.02	0.00	0.00
Diesel Vehicles	0.30	1.71	1.49
Gasoline Vehicles	0.10	0.11	0.58
Coating Fugitives	0.61	0.00	0.00
Lubricant Fugitives	0.84	0.00	0.00
<b>Rheox Plant/Newberry Springs</b>			
Natural Gas Dryer	0.02	2.67	0.72
Natural Gas Boiler	0.05	2.97	0.80
Diesel IC Engine	0.05	0.64	0.14
Propane IC Engine	0.06	0.10	0.09
Gasoline IC Engine	0.02	0.01	0.31

<b>Rheox Mine/Hector</b>			
Blasting	0.00	0.84	3.30
Gasoline IC Engine	0.13	0.06	2.45
Diesel IC Engine	1.68	21.04	4.58
<b>Sierra Aggregate/Lucerne Valley</b>			
Two Diesel IC Engines	0.45	8.65	1.88
<b>Specialty Minerals/Lucerne Valley</b>			
Dry Sizer Burner	0.01	1.44	0.36
IC Engine Genset	0.00	0.01	0.00
Diesel Storage Tank	0.08	0.00	0.00
Gasoline Storage Tank	0.01	0.00	0.00
Mobile Equipment	2.19	36.70	16.02
<b>Victorville Industrial Minerals/Oro Grande</b>			
Diesel Mobile Equipment	0.18	3.42	0.74
Gasoline Mobile Equipment	0.09	0.07	2.60
<b>Category Totals (tons per year):</b>	<b>11.19</b>	<b>137.44</b>	<b>74.88</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using emission factors. Activity levels were provided by individual facilities.

**Category: Petroleum Terminals**

	VOC	NOx	CO	
Total Emissions:	0.08	0.00	0.00	(tons per ozone seasonal day)
	0.08	0.00	0.00	(tons per average annual day)
	30.11	0.00	0.00	(tons per year)

SIC 5171 (Petroleum Bulk Stations and Terminals)

Petroleum Terminals is composed of three facilities:

Facility Name/Location	VOC	NOx	CO
<b>CalNev Pipeline/Barstow Class A Terminal</b>			
Fourteen Storage Tanks	17.04	0.00	0.00
Two Loadout Racks	5.19	0.00	0.00
Three Transmix Pumps	0.49	0.00	0.00
Gasoline Pump	1.13	0.00	0.00
Diesel Pump	0.23	0.00	0.00
Liquid Valve Fugitives (216 valves)	0.10	0.00	0.00
Vapor Valve Fugitives (14 valves)	0.18	0.00	0.00
Vapor Compressor	0.21	0.00	0.00
Relief Valve Fugitives	0.32	0.00	0.00
Degreaser Fugitives	0.42	0.00	0.00

**CalNev Pipeline GAFB/Victorville**

Three JP-4 Storage Tanks	3.57	0.00	0.00
Four Pumps	0.64	0.00	0.00
Liquid Valve Fugitives	0.02	0.00	0.00

**Victorville Oil/Victorville**

Storage Tanks	0.33	0.00	0.00
Loadout Rack	0.23	0.00	0.00

<b>Category Totals (tons per year):</b>	<b>30.11</b>	<b>0.00</b>	<b>0.00</b>
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Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using emission factors. Activity levels were provided by facilities.

**Category: Electric Utility and Electricity Generation Facilities**

	VOC	NOx	CO	
Total Emissions:	1.12	4.41	2.50	(tons per ozone seasonal day)
	1.12	4.41	2.50	(tons per average annual day)
	408.91	1608.66	911.59	(tons per year)

SIC 4911 (Electric Services)

SCC 2-01-002-01 (Natural Gas Turbine Generator)

SCC 1-03-006-01 (Industrial Natural Gas Boiler 10-100 mmbtu/hr)

Electric Utilities and Generators is composed of five facilities:

Facility Name/Location	VOC	NOx	CO
<b>Daggett Leasing/Daggett (SEGS I &amp; II)</b>			
Natural Gas Boiler	0.37	6.68	6.66
Super Heater	0.02	2.37	0.81
Three Heaters	0.08	0.96	0.19
Diesel IC Engines	0.09	1.30	0.23
Ullage	0.00	0.14	0.03
Caloria Fugitives	2.50	0.00	0.00
Therminol Fugitives	3.92	0.00	0.00
Gasoline Vehicles	0.02	0.05	0.15
Diesel Vehicles	0.03	0.16	0.07
Non-retail Gasoline Dispensing	0.07	0.00	0.00
<b>Harper Lake/Harper Lake (SEGS VIII &amp; IX)</b>			
Two Natural Gas Boilers	0.80	9.33	9.15
Diesel IC Engines	0.03	0.42	0.07
Therminol Fugitives	16.62	0.00	0.00
Gasoline Vehicles	0.03	0.06	0.21

Diesel Vehicles	0.03	0.15	0.07
Non-retail Gasoline Dispensing	0.03	0.00	0.00
<b>Kramer Junction/Kramer Junction (SEGS III - VII)</b>			
Five Natural Gas Boilers	0.49	58.45	26.89
Five Auxiliary Heaters	0.05	2.99	2.44
Nine IC Engines	0.14	3.24	0.57
Therminol Fugitives	19.58	0.00	0.00
Gasoline Vehicles	0.05	0.13	0.44
Diesel Vehicles	0.01	0.74	0.34
Non-retail Gasoline Dispensing	0.13	0.00	0.00
<b>Southern California Edison, Coolwater/Daggett</b>			
Two Natural Gas Boilers	14.23	181.62	24.17
Two Combined Cycle Turbines	347.47	1319.57	834.17
Storage Tanks	1.28	0.00	0.00
<b>U.S. West/Oro Grande</b>			
Two Natural Gas Boilers	0.84	20.30	5.00
<b>Category Totals (tons per year):</b>	<b>408.91</b>	<b>1608.66</b>	<b>911.59</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using source test results and emission factors. Activity levels were provided by facilities.

**Category: Military Bases**

	VOC	NOx	CO	
Total Emissions:	1.90	2.49	8.20	(tons per ozone seasonal day)
	1.90	2.49	8.20	(tons per average annual day)
	692.61	909.55	2991.85	(tons per year)

SIC 9711 (National Security Administration)

Military Bases is composed of five facilities:

Facility Name/Location	VOC	NOx	CO
<b>Edwards Air Force Base</b>			
Four Rocket Test Stands	0.00	0.60	17.50
<b>George Air Force Base/Victorville</b>			
Hospital Incinerator	0.01	0.01	0.00
Fire Fighting Practice Pit	14.18	0.18	24.81
Heating, Cooling and Power	6.77	127.39	25.51
Aircraft Corrosion Control	10.76	0.00	0.00
Base Paint Shops	4.38	0.00	0.00
Aerospace Ground Equipment	10.08	128.60	63.47



Bulk Fuel Storage	6.59	0.00	0.00
Fueling Operations	109.40	0.00	0.00
Aircraft Flying Operations	113.32	166.84	539.89
Aircraft Ground Operations	1.60	3.59	7.11
Civilian Ground Vehicles	56.85	37.64	323.71
Military Ground Vehicles	8.14	12.50	59.67
<b>USMC AGCC/Twenty-nine Palms</b>			
Three Boilers (NG/Diesel)	0.32	13.77	2.78
16 Diesel Water Heaters	0.00	0.06	0.01
Natural Gas Boilers	0.00	0.31	0.07
ETO Sterilizers	0.01	0.00	0.00
Diesel Generator	0.01	0.14	0.03
Two Nonretail Gasoline Dispensing	2.93	0.00	0.00
Six Coating Operations	0.29	0.00	0.00
23 Diesel Generators	0.16	2.90	0.68
Natural Gas Space Heaters	0.07	3.15	0.63
Natural Gas Water Heaters	0.04	2.07	0.41
Miscellaneous Propane	0.00	0.02	0.01
Diesel Base Vehicles	1.57	30.10	6.55
Gasoline Base Vehicles	20.70	14.78	570.79
Private Gasoline Vehicles	2.60	5.50	34.20
Diesel Tactical Vehicles	0.93	17.88	3.89
Fugitive Coatings	4.94	0.00	0.00
Military Fixed-Wing Aircraft	146.33	114.40	531.84
Military Rotary-Wing Aircraft	33.56	54.24	110.89
<b>USMC Logistics Base Nebo Annex/Barstow</b>			
Twelve Boilers	3.04	19.17	1.27
Twenty IC Engines	0.11	73.23	23.63
Gasoline Dispensing	0.86	0.00	0.00
Spray Booths	20.15	0.00	0.00
Dip Tanks	0.08	0.00	0.00
JP-5 Tanks	0.02	0.00	0.00
Diesel Vehicles	0.07	0.05	2.21
Antifreeze Fugitives	0.54	0.00	0.00
Gasoline Vehicles	5.01	2.41	92.99
<b>USMC Logistics Base/Yermo</b>			
Five Natural Gas Boilers	0.60	11.65	0.22
Degreasers	32.27	0.00	0.00
Seven Diesel IC Engines	6.05	31.45	447.08
Nine Spray Booths	59.42	0.00	0.00
Stenciling	0.81	0.00	0.00
Dip Tanks	0.39	0.00	0.00

Diesel Test Stand	0.38	17.32	3.77
JP-5 Test Stands	0.02	0.29	0.06
Six IC Engine Test Stands	0.97	13.95	3.04
Two IC Engine Compressors	0.06	0.66	0.14
Solvent Still Fugitives	0.36	0.00	0.00
Gasoline Vehicles	4.86	2.41	92.99
<b>Category Totals (tons per year):</b>	<b>692.61</b>	<b>909.55</b>	<b>2991.85</b>

The 1990 George Air Force Base (GAFB) inventory was taken directly from Air Force report describing 1989 through 1992 GAFB emissions ("Air Emissions Inventory Report for George Air Force Base," Galson Corporation 1/94). Other emission information was obtained from criteria emission inventory submissions. Emissions were estimated using emission factors with actual activity levels; activity levels were substantiated using signed records.

**Category: Medical Facilities**

	VOC	NOx	CO	
Total Emissions:	0.02	0.07	0.01	(tons per ozone seasonal day)
	0.02	0.07	0.01	(tons per average annual day)
	8.69	26.56	3.63	(tons per year)

**SIC 8062 (General Medical and Surgical Hospitals)**

Medical Facilities is composed of three facilities:

Facility Name/Location	VOC	NOx	CO
<b>Hi-Desert Medical Center/Joshua Tree</b>			
Incinerator	0.00	0.13	0.00
Natural Gas Space Heating	0.01	0.43	0.09
Coating Fugitives	1.41	0.00	0.00
<b>Saint Mary Desert Valley Hospital/Apple Valley</b>			
Two Natural Gas Boilers	0.10	4.59	0.92
Diesel Generator	0.01	0.11	0.02
Formaldehyde Fugitives	0.16	0.00	0.00
<b>Victor Valley Community Hospital/Victorville</b>			
Two Boilers	0.06	3.00	0.40
Two IC Engines	0.05	0.63	0.14
Cogeneration	6.89	17.67	2.06
<b>Category Totals (tons per year):</b>	<b>8.69</b>	<b>26.56</b>	<b>3.63</b>

Emission information was obtained from criteria emission inventory submissions, and does not represent all medical facilities, others will be added as information becomes available. Emissions were estimated using equipment-specific emission factors. Activity levels were

provided by facilities.

**Category: Crematoria**

	VOC	NOx	CO	
Total Emissions:	0.00	0.00	0.00	(tons per ozone seasonal day)
	0.00	0.00	0.00	(tons per average annual day)
	0.10	0.00	0.00	(tons per year)

SIC 7261 (Funeral Service and Crematories)

Crematoria is composed of two facilities:

Facility Name/Location	VOC	NOx	CO
<b>Memorial Conservatory/Joshua Tree</b>			
Crematorium	0.02	0.00	0.00
<b>Victor Valley Memorial Park/Victorville</b>			
Crematorium	0.08	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>0.10</b>	<b>0.00</b>	<b>0.00</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using equipment-specific emission factors. Activity levels were provided by facilities.

**Category: Miscellaneous Coating Operations**

	VOC	NOx	CO	
Total Emissions:	0.02	0.01	0.00	(tons per ozone seasonal day)
	0.02	0.01	0.00	(tons per average annual day)
	8.90	3.28	0.79	(tons per year)

SIC 2711 (Newspapers: Publishing)

SIC 4899 (Miscellaneous Communications Services)

SIC 3499 (Miscellaneous Metal Product Fabrication)

SIC 3479 (Miscellaneous Metal Coating)

SIC 3272 (Concrete Products)

SIC 3291 (Abrasive Products)

Six facilities comprise Miscellaneous Coating Operations:

Facility Name/Location	VOC	NOx	CO
<b>Daily Press/Victorville</b>			
Printing	1.62	0.00	0.00

<b>Lockheed/Helendale</b>				
Four IC Engines	0.00	0.22	0.05	
Non-retail Gasoline Dispensing	0.02	0.00	0.00	
Spray Booths	0.23	0.00	0.00	
Coatings	0.24	0.00	0.00	
<b>Ludlow Engineering/Hesperia</b>				
Coating	0.07	0.00	0.00	
<b>McWelco/Hesperia</b>				
Coating	1.52	0.00	0.00	
<b>Northwest Pipe &amp; Casing/Adelanto</b>				
Natural Gas Boiler	0.00	0.03	0.01	
Taping	4.01	0.00	0.00	
Diesel Mobile Equipment	0.16	3.03	0.73	
<b>Tepco/Phelan</b>				
Prep Line	0.18	0.00	0.00	
Unitized	0.23	0.00	0.00	
Cleanup	0.62	0.00	0.00	
<b>Category Totals (tons per year):</b>	<b>8.90</b>	<b>3.28</b>	<b>0.79</b>	

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using coating-specific emission factors. Activity levels were provided by facilities.

**Category: Composite Fabric (Fiberglass) Operations**

	VOC	NOx	CO	
Total Emissions:	0.01	0.00	0.00	(tons per ozone seasonal day)
	0.01	0.00	0.00	(tons per average annual day)
	4.00	0.00	0.00	(tons per year)

SIC 3088 (Plastics Plumbing Fixtures)

One facility makes up Composite Fabric (Fiberglass) Operations:

<b>Facility Name/Location</b>	<b>VOC</b>	<b>NOx</b>
<b>Pacific Tank/Oro Grande</b>		
Fiberglass	4.00	0.00
<b>Category Totals (tons per year):</b>	<b>4.00</b>	<b>0.00</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using operation-specific emission factors. Activity levels were provided by facilities.

**Category: Cement Manufacturing**

	VOC	NOx	CO	
Total Emissions:	0.65	26.80	5.97	(tons per ozone seasonal day)
	0.65	26.80	5.97	(tons per average annual day)
	236.19	9782.93	2177.62	(tons per year)

SIC 3241 (Hydraulic Cement Manufacturing)

Primary SCC 3-05-006-06 (Cement Manufacturing Dry Process Kiln)

Four Facilities make up Cement Manufacturing:

Facility Name/Location	VOC	NOx	CO
<b>Mitsubishi Cement/Lucerne Valley</b>			
Coal-Fired Kiln	32.02	2514.96	437.15
Two Diesel IC Engine Comps	0.32	6.03	1.31
Three Diesel IC Engine Drills	0.46	8.91	1.94
Gasoline Vehicles	0.02	0.86	5.86
Diesel Vehicles	0.06	2.29	1.55
Diesel Equipment and Rail	0.45	34.08	7.92
Space Heating Fugitives	0.02	0.99	0.20
<b>Riverside Cement/Oro Grande</b>			
Seven Coal-Fired Cement Kilns	111.72	3292.13	138.37
Seven Natural Gas Kiln Preheaters	0.03	32.77	2.33
Gasoline Storage Tank	0.05	0.00	0.00
Solvents/Coatings Fugitives	4.40	0.00	0.00
Vehicle Exhaust	3.79	2.71	104.62
Heavy Equipment Exhaust	4.52	86.82	18.88
Miscellaneous Equipment Exhaust	0.39	18.70	3.74
<b>Southwest Portland Cement Quarry/Apple Valley</b>			
Two Coal-Fired Cement Kilns	68.15	3642.76	1352.55
Raw Mill	0.01	0.24	0.05
Non-Retail Gasoline Transfer	0.05	0.00	0.00
Mobile Diesel Equipment	4.99	95.82	20.84
Mobile Gasoline Equipment	1.95	1.39	53.75
Mobile LPG Equipment	0.01	0.08	0.08
<b>Southwest Portland Cement River Plant/Victorville</b>			
Non-Retail Gasoline Dispensing	0.02	0.00	0.00
Diesel Mobile Equipment	2.09	40.44	8.80
Gasoline Mobile Equipment	0.62	0.45	17.21
Propane Mobile Equipment	0.06	0.50	0.47
<b>Category Totals (tpy):</b>	<b>236.19</b>	<b>9782.93</b>	<b>2177.62</b>

Emission information was obtained from criteria emission inventory submissions. Emissions

were estimated using source test results for kilns and emission factors for other sources. Activity levels were provided by facilities.

**Category: Paint & Body Shops**

	VOC	NOx	CO	
Total Emissions:	0.04	0.00	0.00	(tons per ozone seasonal day)
	0.04	0.00	0.00	(tons per average annual day)
	14.10	0.00	0.00	(tons per year)

SIC 7532 (Automotive Top, Body, and Upholstery Repair Shops and Paint Shops)  
Primary SCC 4-02-016-20 (Auto and Light Truck Repair Topcoat Application)

Paint & Body Shops is composed of the following 35 coating facilities:

Facility Name/Location	VOC	NOx	CO
A&A Auto Body & Glass/Hesperia	0.40	0.00	0.00
Accent Auto/Hesperia	0.57	0.00	0.00
Best Auto Body/Hesperia	0.05	0.00	0.00
CA Auto Restoration Service/Adelanto	0.40	0.00	0.00
California Classics Paint & Body/Hesperia	0.40	0.00	0.00
California Collision Center/Yucca Valley	0.40	0.00	0.00
Collision Craft/Hesperia	0.40	0.00	0.00
D&D Welding/Barstow	0.09	0.00	0.00
Dave's Auto Body/Lenwood	0.08	0.00	0.00
Derby Dink/Hesperia	0.84	0.00	0.00
Doman Auto Body/Hesperia	0.19	0.00	0.00
Doug's Auto Body/Barstow	0.40	0.00	0.00
Dream Detailing/Barstow	0.40	0.00	0.00
Happy Trails/Apple Valley	0.37	0.00	0.00
H&H Body Shop/Barstow	0.40	0.00	0.00
Ison's Quality Auto Body/Apple Valley	0.40	0.00	0.00
Jack B. Kelly/Adelanto	0.06	0.00	0.00
Lefevre's Tow & Body Shop/Yucca Valley	0.40	0.00	0.00
Louis Zamora Body & Paint/Victorville	0.06	0.00	0.00
McGeez Auto Body/Twenty-nine Palms	0.40	0.00	0.00
Mel's Auto Body/Apple Valley	0.40	0.00	0.00
Mojave Coach Works/Apple Valley	0.40	0.00	0.00
Monty's Chevrolet/Victorville	0.98	0.00	0.00
Nexday Paint & Body/Victorville	0.40	0.00	0.00
Pacific Paint & Body/Hesperia	0.17	0.00	0.00
Rancho Motors/Victorville	0.75	0.00	0.00
Rod's Body Shop/Barstow	0.40	0.00	0.00

Sonshine Auto/Victorville	0.99	0.00	0.00
Soutar's/Barstow	0.40	0.00	0.00
Sun & Shine Used Cars/Lenwood	0.05	0.00	0.00
Sunland Ford/Victorville	0.23	0.00	0.00
Sunset Paint & Body/Hesperia	0.93	0.00	0.00
Tri-Community Auto Body & Paint/Phelan	0.40	0.00	0.00
Yucca Auto Body/Yucca Valley	0.97	0.00	0.00
Yucca Valley Ford/Yucca Valley	0.32	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>14.10</b>	<b>0.00</b>	<b>0.00</b>

Emission information was obtained from criteria emission inventory submissions; this information represents the best available summary of paint & body activity and is a work in progress. Emissions were estimated using emission factors for coatings used by each facility. Activity levels were provided by facilities.

**Category: Natural Gas Utilities**

	VOC	NOx	CO	
Total Emissions:	1.33	14.52	1.97	(tons per ozone seasonal day)
	1.33	14.52	1.97	(tons per average annual day)
	480.20	5299.80	717.80	(tons per year)

SIC 4923 (Gas Transmission and Distribution)

Primary SCC 2-02-002-02 (Industrial IC Engine Natural Gas Reciprocating)

Four facilities make up Natural Gas Utilities:

Facility Name/Location	VOC	NOx	CO
<b>Pacific Gas &amp; Electric/Hinkley</b>			
18 Natural Gas IC Engines	298.70	3504.00	443.20
<b>So. California Gas/Adelanto</b>			
Natural Gas IC Engines	3.05	32.75	4.10
Natural Gas Turbines	17.15	216.05	76.80
Coater	1.52	0.00	0.00
Tank	0.38	0.00	0.00
Natural Gas Releases	2.24	0.00	0.00
Vent Stack Fugitives	0.22	0.00	0.00
Degreasing Fugitives	0.18	0.00	0.00
Fittings Fugitives	0.14	0.00	0.00
Seals Fugitives	0.22	0.00	0.00
<b>So. California Gas/Newberry Springs</b>			
Ten Natural Gas IC Engines	144.07	1547.00	193.70
Coater	0.04	0.00	0.00

Tank	0.29	0.00	0.00
Natural Gas Releases	8.49	0.00	0.00
Fittings Fugitives	0.56	0.00	0.00
Degreasing Fugitives	1.13	0.00	0.00
Seals Fugitives	1.53	0.00	0.00
<b>So. California Gas/Victorville</b>			
Coater	0.02	0.00	0.00
Gasoline Dispensing	0.23	0.00	0.00
Degreasing Fugitives	0.04	0.00	0.00
<b>Category Totals (tpy):</b>	<b>480.20</b>	<b>5299.80</b>	<b>717.80</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using source test results for IC engines and emission factors for other sources. Activity levels were provided by facilities.

**Category: Wood Coating Operations**

	VOC	NOx	CO	
Total Emissions:	0.23	0.00	0.00	(tons per ozone seasonal day)
	0.23	0.00	0.00	(tons per average annual day)
	80.17	0.00	0.00	(tons per year)

SIC 2591 (Drapery Hardware & Blinds/Shades Manufacturing)  
SIC 3931 (Musical Instrument Manufacturing)  
Primary SCC 4-02-001-10 (Solvent Based Paint Surface Coating)

Wood Coating Operations is composed of the following six coating facilities:

Facility Name/Location	VOC	NOx	CO
C & M Wood Industries/Hesperia	29.10	0.00	0.00
Commercial Wood Products/Adelanto	3.14	0.00	0.00
Inland Panel/Adelanto	20.88	0.00	0.00
Mueller Turner/Yucca Valley	0.95	0.00	0.00
Terrell Industries/Hesperia	9.80	0.00	0.00
Walnut Valley Finishing/Adelanto	16.30	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>80.17</b>	<b>0.00</b>	<b>0.00</b>

Emission information was obtained from criteria emission inventory submissions. Emissions were estimated using emission factors specific to coating type(s) used by each facility. Activity levels were provided by facilities.



## b. STATIONARY AREA SOURCES

For the purpose of this document, Stationary Area Sources are typically composed of many individually small but collectively significant sources that fall under the District's jurisdiction. "Methods for Assessing Area Source Emissions in California," CARB September 1991, is the primary area source methodology reference.

### Category: Agricultural and Commercial Pesticides

	VOC	NOx	CO	
Total Emissions:	1.51	0.00	0.00	(tons per ozone seasonal day)
	1.51	0.00	0.00	(tons per average annual day)
	550.00	0.00	0.00	(tons per year)

1418 tons of Agricultural and Commercial pesticides were used in 1990:

Source Type	VOC	NOx	CO
<b>CES 82289 Agricultural Residual Nonsynthetic Pesticides</b>			
33 tons sprayed	29.00	0.00	0.00
<b>CES 83212 Agricultural Synthetic Pesticides</b>			
34 tons sprayed	29.00	0.00	0.00
<b>CES 83220 Agricultural Nonsynthetic Pesticides</b>			
388 tons sprayed	80.00	0.00	0.00
<b>CES 83261 Other Nonagricultural Synthetic Pesticides</b>			
76 tons sprayed	58.00	0.00	0.00
<b>CES 83279 Other Nonagricultural Nonsynthetic Pesticides</b>			
214 tons sprayed	197.00	0.00	0.00
<b>CES 83329 Creosote Application</b>			
673 tons sprayed	157.00	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>550.00</b>	<b>0.00</b>	<b>0.00</b>

The federal ozone nonattainment area has 29,488 acres of agricultural land under cultivation, primarily alfalfa (17,358 acres), irrigated pasture (3150 acres), grain hay (2385 acres), grapes (1265 acres) and sudan grass (1161 acres).

Emissions estimates were made by CARB using area source methodologies. CARB used Pesticide Use Report data specific to the District as provided by local pesticide users to the California Department of Food and Agriculture. Pesticide emissions are determined by algorithms derived by CARB contractors for each pesticide type involving temperature, relative humidity, evaporation, pesticide vapor pressure, and pesticide molecular weight. Climatological data used was specific to the District. The federal ozone nonattainment area pesticide emissions were disaggregated from the District pesticide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent), since the majority of agricultural operations are within the federal ozone nonattainment area.

**Category: Architectural Coatings and Thinners**

	VOC	NOx	CO	
Total Emissions:	5.14	0.00	0.00	(tons per ozone seasonal day)
	4.06	0.00	0.00	(tons per average annual day)
	1482.00	0.00	0.00	(tons per year)

1,592,000 gallons of Architectural Coatings and Thinners were used in 1990:

Source Type	VOC	NOx	CO
<b>CES 46755 Water-Based Architectural Coatings</b>			
965,000 gallons at 497.2 lbs/1000 gal	240.00	0.00	0.00
<b>CES 46763 Oil-Based Architectural Coatings</b>			
580,000 gallons at 3,760 lbs/1000 gal	1091.00	0.00	0.00
<b>CES 46771 Cleanup and Thinning Solvents</b>			
47,000 gallons at 6,400 lbs/1000 gal	151.00	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>1482.00</b>	<b>0.00</b>	<b>0.00</b>

Emissions estimates were made by CARB using area source methodologies. CARB used state-wide manufacturer surveys to establish emission factors and state-wide architectural coating and thinner production/consumption. State-wide consumption is allocated to the District using the District's proportion of the State-wide population (0.9 percent). The federal ozone nonattainment area consumption was disaggregated from the District consumption using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 1.265, reflecting increased use of architectural coatings during the warm summer months.

**Category: Asphalt Paving Applications**

	VOC	NOx	CO	
Total Emissions:	0.77	0.00	0.00	(tons per ozone seasonal day)
	0.77	0.00	0.00	(tons per average annual day)
	280.00	0.00	0.00	(tons per year)

400,016 tons of Asphalt Paving Materials were applied in 1990:

Source Type	VOC	NOx	CO
<b>CES 46870 Cutback Asphalt</b>			
40 tons applied at 250 lbs/ton	5.00	0.00	0.00
<b>CES 46888 Road Oils</b>			
400 tons applied at 58 lbs/ton	12.00	0.00	0.00
<b>CES 46896 Hot-Mix Asphalt</b>			
393,000 tons applied at 0.8 lbs/ton	223.00	0.00	0.00
<b>CES 46904 Emulsified Asphalt</b>			
6,576 tons applied at 20 lbs/ton	40.00	0.00	0.00

**Category Totals (tons per year): 280.00 0.00 0.00**

Emissions estimates were made using District-determined activity rates and industry-accepted emission factors. Primary asphalt producers and consumers (such as asphalt batch plants, Caltrans, highway contractors, and the County of San Bernardino) were contacted to establish asphalt and asphalt product consumption. Asphalt and asphalt product producers, such as District asphalt batch plants, were consulted to determine asphalt application emission factors. The federal ozone nonattainment area asphalt product consumption was disaggregated from the District-wide asphalt product consumption using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Commercial Charbroilers**

	VOC	NOx	CO	
Total Emissions:	0.13	0.00	0.00	(tons per ozone seasonal day)
	0.13	0.00	0.00	(tons per average annual day)
	47.00	0.00	0.00	(tons per year)

115 Commercial Charbroilers operated in 1990:

Source Type	VOC	NOx	CO
<b>CES 60418 Commercial Charbroiling</b>			
115 Commercial Charbroilers at 820 lbs/facility	47.00	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>47.00</b>	<b>0.00</b>	<b>0.00</b>

Emissions estimates were made using District-provided number of facilities and SCAQMD charbroiler facility-based emission factor. The number of commercial charbroilers was determined by reviewing a San Bernardino County permit list that included food preparation facilities. Charbroilers, deep fat fryers and unspecified cooking equipment were extracted from this list. The number of federal ozone nonattainment area charbroilers was disaggregated from the District number using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Commercial Liquid Petroleum Gas Combustion**

	VOC	NOx	CO	
Total Emissions:	0.01	0.25	0.05	(tons per ozone seasonal day)
	0.03	0.75	0.15	(tons per average annual day)
	11.00	275.00	55.00	(tons per year)

5,500,000 gallons of LPG were burned at Commercial sources in 1990:

Source Type	VOC	NOx	CO
<b>CES 58727 Commercial LPG Combustion</b>			
5,500,000 gallons	11.00	275.00	55.00

**Category Totals (tons per year): 11.00 275.00 55.00**

Emissions estimates were made by CARB using area source methodologies; this category will be refined as more information becomes available, as it is believed the LPG throughput includes residential consumption. CARB used District-specific LPG consumption figures and EPA (AP-42) LPG equipment emission factors. The federal ozone nonattainment area LPG consumption was disaggregated from the District consumption using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 0.337, primarily reflecting decreased use of LPG in space heaters during the warm summer months.

**Category: Commercial Natural Gas Combustion**

	VOC	NOx	CO	
Total Emissions:	0.00	0.07	0.00	(tons per ozone seasonal day)
	0.00	0.13	0.01	(tons per average annual day)
	0.00	47.49	2.29	(tons per year)

655.03 mmcf of natural gas were burned in Commercial sources in 1990:

Source Type	VOC	NOx	CO
<b>CES 47167 Commercial Natural Gas Combustion - Unspecified</b>			
372.38 mmcf	0.00	27.00	1.30
<b>CES 58735 Commercial Natural Gas Combustion - Space Heating</b>			
205.68 mmcf	0.00	14.91	0.72
<b>CES 58743 Commercial Natural Gas Combustion - Water Heating</b>			
76.97 mmcf	0.00	5.58	0.27
<b>Category Totals (tons per year):</b>	<b>0.00</b>	<b>47.49</b>	<b>2.29</b>

Emissions estimates were made using District-determined commercial natural gas consumption and EPA/SCAQMD emission factors. The federal ozone nonattainment area commercial natural gas consumption was disaggregated from the District-wide consumption using the federal ozone nonattainment proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 0.434 for unspecified and space heating commercial natural gas use, 1.00 for water heating, primarily reflecting decreased use of LPG in space heaters during the warm summer months.

**Category: Gasoline Dispensing**

	VOC	NOx	CO	
Total Emissions:	3.26	0.00	0.00	(tons per ozone seasonal day)
	3.26	0.00	0.00	(tons per average annual day)
	1191.86	0.00	0.00	(tons per year)

219,858,643 gallons of gasoline were dispensed through 200 gasoline service stations in 1990; 698,667 gallons uncontrolled, 99,150,895 gallons through Phase I vapor recovery equipment, and 120,010,552 gallons through Phase I & II vapor recovery equipment:

Source Type	VOC	NOx	CO
<b>Uncontrolled Splash Fill</b>			
at 23 lbs/1000 gal	8.03	0.00	0.00
<b>CES 46532 Gasoline Dispensing Tanks - Working Losses</b>			
Phase I at 10 lbs/1000 gal	490.75	0.00	0.00
Phase I & II at 0.5 lbs/1000 gal	30.00	0.00	0.00
<b>CES 46540 Vehicle Refueling - Vapor Replacement</b>			
Phase I at 10.5 lbs/1000 gal	515.54	0.00	0.00
Phase I & II at 0.52 lbs/1000 gal	31.20	0.00	0.00
<b>CES 46557 Gasoline Dispensing Tanks - Breathing Losses</b>			
Phase I at 1.05 lbs/1000 gal	52.05	0.00	0.00
Phase I & II at 0.1 lbs/1000 gal	6.00	0.00	0.00
<b>CES 46565 Vehicle Refueling - Spillage</b>			
Phase I at 0.74 lbs/1000 gal	36.69	0.00	0.00
Phase I & II at 0.36 lbs/1000 gal	21.60	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>1191.86</b>	<b>0.00</b>	<b>0.00</b>

Emissions estimates were made using CARB area source methodologies; non-retail gasoline dispensing emissions will be added as information becomes available. Service station gasoline throughput is multiplied by emission factors for each gasoline transfer step (storage tank filling, vehicle filling, spillage during vehicle filling, and storage tank diurnal breathing). Emission factors are from AP-42 with phase II emission factors established by CARB service station certification testing. Emission factors have been adjusted to reflect MDAQMD rule effectiveness of 95 percent for Phase I and 96.5 percent for Phase II. Phase I/Phase II 1990 installation status and gasoline throughput were determined through analysis of District permit records. Federal ozone nonattainment area gasoline throughput was determined from District permit records and service station surveys.

#### **Category: Industrial Natural Gas Combustion**

	VOC	NOx	CO	
Total Emissions:	0.00	0.04	0.00	(tons per ozone seasonal day)
	0.00	0.03	0.00	(tons per average annual day)
	0.00	11.08	1.08	(tons per year)

126.59 mmcf of natural gas were burned in miscellaneous industrial sources in 1990:

Source Type	VOC	NOx	CO
<b>CES 47142 Industrial Natural Gas Combustion (Unspecified)</b>			
126.59 mmcf	0.00	11.08	1.08

**Category Totals (tons per year): 0.00 11.08 1.08**

Emissions estimates were made using District-determined industrial natural gas consumption (by uninventoried sources) and EPA/SCAQMD emission factors. The federal ozone nonattainment area industrial natural gas consumption was disaggregated from the District-wide consumption using the federal ozone nonattainment proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 1.277, reflecting increased use of natural gas by industry during the summer.

**Category: Landfill Biodegradation**

	VOC	NOX	CO	
Total Emissions:	0.15	0.00	0.00	(tons per ozone seasonal day)
	0.15	0.00	0.00	(tons per average annual day)
	55.00	0.00	0.00	(tons per year)

There were 12 landfills accepting municipal waste in 1990: Apple Valley, Barstow, Hesperia, Landers, Lenwood, Lucerne, Morongo, Newberry Springs, Phelan, USMC 29 Palms, Victorville, and Yermo

Source Type	VOC	NOx	CO
<b>CES 57281 Municipal Waste Disposal (Biodegradation)</b>			
5,238,000 tons of waste at 0.021 lbs/ton	55.00	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>55.00</b>	<b>0.00</b>	<b>0.00</b>

Emissions estimate was made using District-provided landfill activity rate and CARB landfill gas emission factor, modified for District climate. District landfill waste totals were determined from landfill permits and historical permit activity as estimated by San Bernardino County Solid Waste Management. The landfill gas emission factor was modified by the District to reflect local (desert) effects on landfill gas generation rates. District landfill gas concentrations as measured with Solid Waste Assessment Tests were found to be 12.17 percent of state-wide average landfill gas concentrations. This factor was applied to the landfill gas emission factor. The federal ozone nonattainment area landfill gas emissions were disaggregated from the District landfill gas emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Livestock Waste Volatilization**

	VOC	NOx	CO	
Total Emissions:	0.41	0.00	0.00	(tons per ozone seasonal day)
	0.41	0.00	0.00	(tons per average annual day)
	160.00	0.00	0.00	(tons per year)

4,793,550 animals were resident in 1990:

Source Type	VOC	NOx	CO
<b>CES 66605 Livestock Wastes</b>			
4,726,600 broilers at 0.24 lbs/broiler	57.00	0.00	0.00
11,800 beef cattle at 3.8 lbs/head	22.00	0.00	0.00
14,950 dairy cattle at 9.4 lbs/head	70.00	0.00	0.00
20,000 sheep at 0.07 lbs/head	1.00	0.00	0.00
2,800 swine at 0.7 lbs/head	1.00	0.00	0.00
18,000 horses at 1 lb/head	9.00	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>160.00</b>	<b>0.00</b>	<b>0.00</b>

Emissions estimates were made using District-determined livestock populations and EPA/SCAQMD emission factors modified by the District for local climate. The San Bernardino County Agricultural Commission, District University of California Cooperative Extension, Bureau of Land Management, and local veterinarians were contacted to obtain livestock populations. Population data was given as an instantaneous population, which was converted into an annual residence time by determining lifecycle (in the case of broilers, eight weeks out of ten for a residency factor of 0.8) or occupancy time within the District (in the case of sheep grazing on both BLM and private lands, half the year on average for a residency factor of 0.5). Species-specific factors from EPA/SCAQMD sources were used, adjusted where necessary for animal population age (size) mix. Climate effect was accounted for by using the District moisture factor of 0.1217, describing the relative humidity between the District and the State-wide average. This factor was determined by comparing District landfill gas generation to the state-wide average landfill gas generation rate. The federal ozone nonattainment area livestock population was disaggregated from the District-wide livestock population using the federal ozone nonattainment proportion of the District-wide human population (93.6 percent).

#### **Category: Residential Natural Gas Combustion**

	VOC	NOx	CO	
Total Emissions:	0.00	0.09	0.01	(tons per ozone seasonal day)
	0.00	0.17	0.03	(tons per average annual day)
	0.98	61.02	11.68	(tons per year)

1122.77 mmcf of natural gas were burned in residential equipment in 1990:

Source Type	VOC	NOx	CO
<b>CES 47191 Residential Natural Gas Combustion (Unspecified)</b>			
44.24 mmcf	0.06	1.61	1.31
<b>CES 54569 Residential Natural Gas Combustion (Space Heating)</b>			
528.04 mmcf	0.70	26.40	5.28
<b>CES 54577 Residential Natural Gas Combustion (Water Heating)</b>			
487.28 mmcf	0.14	30.70	3.22

**CES 54585 Residential Natural Gas Combustion (Cooking)**

63.21 mmcf	0.08	2.31	1.87
<b>Category Totals (tons per year):</b>	<b>0.98</b>	<b>61.02</b>	<b>11.68</b>

Emissions estimates were made using District-determined residential natural gas consumption data and EPA/SCAQMD emission factors. The federal ozone nonattainment area residential natural gas consumption was disaggregated from the District-wide consumption using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 0.00 for unspecified and space heating, 1.00 for water heating and cooking, reflecting decreased residential use of natural gas for space heating during the warm summer months.

**Category: Residential Wood Combustion**

	VOC	NOx	CO	
Total Emissions:	0.00	0.00	0.00	(tons per ozone seasonal day)
	0.56	0.26	6.86	(tons per average annual day)
	204.72	94.33	2505.54	(tons per year)

29,477 tons of wood were burned in residential equipment in 1990:

Source Type	VOC	NOx	CO
<b>EIC 6106000230 Residential Wood Combustion - Wood Stoves</b>			
4761 tons burned	33.07	15.24	404.68
<b>EIC 6106020230 Residential Wood Combustion - Fireplaces</b>			
24716 tons burned	171.65	79.09	2100.86
<b>Category Totals (tons per year):</b>	<b>204.72</b>	<b>94.33</b>	<b>2505.54</b>

Emissions estimates were made by CARB using area source methodologies. CARB used EPA (AP-42) wood combustion emission factors and state-wide residential wood combustion. State-wide consumption is estimated by CARB and allocated to the District using the District's proportion of the state-wide population (0.9 percent). The federal ozone nonattainment area wood combustion was disaggregated from the District total using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 0.00, reflecting decreased residential use of wood for heating during the warm summer months.

**Category: Open Burning**

	VOC	NOx	CO	
Total Emissions:	0.00	0.00	0.00	(tons per ozone seasonal day)
	0.16	0.00	3.35	(tons per average annual day)
	57.21	0.00	1221.96	(tons per year)



15,802 tons of material were burned in 1990:

Source Type	VOC	NOx	CO
CES 47266 Tumbleweed Clearing/Burning			
15,719 tons burned	56.73	0.00	1218.22
CES 47282 Range Improvement Fires			
83 tons burned	0.48	0.00	3.74
Category Totals (tons per year):	57.21	0.00	1221.96

Emissions estimates were made using District-determined open burning activity rates and CARB emission factors. District and County open burning permits were evaluated to determine burning activity rates (number of fires and average area cleared). CARB brush loading factors were used to estimate tumbleweed and range material loadings. CARB/BLM brushfire emission factors were used to estimate emissions. The federal ozone nonattainment area open burning emissions were disaggregated using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 0.00, reflecting the prohibition on permitted burns during the summer fire season.

### c. MOBILE SOURCES

For the purpose of this document, Mobile Sources includes vehicles (such as cars, trucks, trains, off-road vehicles, etc.), mobile equipment (such as heavy diesel equipment), and light mobile equipment (such as chainsaws, lawnmowers, etc.). "Methods for Assessing Area Source Emissions in California," CARB September 1991, is the primary off-road mobile source methodology reference.

#### Category: On-Road Mobile Sources

	VOC	NOx	CO	
Total Emissions:	23.60	30.25	182.62	(tons per ozone seasonal day)
	23.60	30.25	182.62	(tons per average annual day)
	8614.00	11041.25	66656.30	(tons per year)

207,017 vehicles were operated on-road covering 8,007,000 miles per day in 1990:

Source Type	VOC	NOx	CO
<b>Heavy Duty Diesel Trucks</b>	1.59	12.77	5.63
1,812 vehicles covering 615,000 miles per day			
<b>Heavy Duty Gasoline Trucks</b>	1.44	3.89	29.62
5,364 vehicles making 138,732 daily trips over 427,000 miles			
<b>Light Duty Passenger Vehicles</b>	14.44	9.19	99.99
141,249 vehicles making 748,687 daily trips over 5,065,000 miles			
<b>Light Duty Trucks</b>	4.36	2.99	35.11
39,532 vehicles making 153,609 daily trips over 1,417,000 miles			
<b>Medium Duty Trucks</b>	1.63	1.38	11.84
12,703 vehicles making 48,876 daily trips over 456,000 miles			
<b>Motorcycles</b>	0.14	0.03	0.43
6,357 vehicles making 4,774 daily trips over 28,000 miles			
<b>Category Totals (tons per day):</b>	<b>23.60</b>	<b>30.25</b>	<b>182.62</b>

Emissions estimates were made by CARB (model rundates 9/9 and 9/12/94) using the BURDEN7F/EMFAC7F system with vehicle activity input for a portion of the District from SCAG's DTIM. This system uses population data to generate vehicle trips at average generation rates and average trip lengths. These trip numbers are then validated with actual Highway Performance Monitoring System vehicle counts on major arterials and highways. This validated trip information is then put through the EMFAC7F portion of the system, which applies emission factors based on the actual District vehicle fleet mix, derived from Department of Motor Vehicles records. System output takes the form of vehicle totals, vehicle miles travelled, number of trips, and total vehicular emissions (exhaust, diurnal, evaporation, running losses and resting losses). The federal ozone nonattainment area on-road vehicular emissions were disaggregated from the District-wide on-road vehicular emissions using the federal ozone nonattainment area proportion of the District-wide vehicular activity (63.62 percent).

**Category: Lawn & Garden Utility Equipment**

	VOC	NOx	CO	
Total Emissions:	0.22	0.01	1.37	(tons per ozone seasonal day)
	0.19	0.01	1.20	(tons per average annual day)
	69.35	1.94	438.15	(tons per year)

2,809,000 horsepower-hr of Lawn & Garden Utility Equipment were operated in 1990:

Source Type	VOC	NOx	CO
<b>CES 47449 Residential Lawn &amp; Garden Utility Equipment</b>			
1,380,000 horsepower-hr	18.25	1.01	217.65
<b>CES 66746 Commercial Lawn &amp; Garden Utility Equipment</b>			
1,429,000 horsepower-hr	51.10	0.93	220.50
<b>Category Totals (tons per year):</b>	<b>69.35</b>	<b>1.94</b>	<b>438.15</b>

Emissions estimates were made by CARB using area source methodologies and modified by the District to reflect the local desert climate. CARB determined California's share of national utility equipment sales and estimated the distribution of those sales between residential and commercial uses. Attrition scrappage rates, horsepower rating, average annual hours of use, and average load factors were estimated and used to generate state activity rates for residential and commercial equipment. Emissions were calculated using equipment-specific EPA (AP-42) emission factors. District emissions were extracted from state-wide emissions using the District proportion of the state population (0.9 percent). The District reduced the emissions by one-third to reflect the general lack of greenery in the District in relation to the state-wide average. The federal ozone nonattainment area emissions were disaggregated from the District emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 1.145, reflecting the increased use of lawn & garden equipment during the warm summer months.

**Category: Gasoline Recreational Boats**

	VOC	NOx	CO	
Total Emissions:	0.15	0.02	0.58	(tons per ozone seasonal day)
	0.12	0.01	0.48	(tons per average annual day)
	44.00	5.15	173.49	(tons per year)

152,000 gallons of gasoline were burned in Gasoline Recreational Boats in 1990:

Source Type	VOC	NOx	CO
<b>CES 58610 Gasoline Recreational Boats</b>			
152,000 gallons burned	44.00	5.15	173.49
<b>Category Totals (tons per year):</b>	<b>44.00</b>	<b>5.15</b>	<b>173.49</b>

Emissions estimates were made by CARB using area source methodologies. CARB used

District-specific Department of Motor Vehicles boat registration data, estimated boat activity rates (by use area), and District-specific estimated use area (specifying length of river and area of lakes). Emissions were calculated using EPA (AP-42) emission factors. The federal ozone nonattainment area boat activity was disaggregated from the District-wide activity by 95% to reflect the exclusion of the Colorado River traffic from the federal ozone nonattainment area. Ozone seasonal day emissions were estimated using a temporal factor of 1.217, reflecting the increased use of recreational boats during the warm summer months.

**Category: Off-Road Heavy Duty Farm Equipment**

	VOC	NOx	CO	
Total Emissions:	0.01	0.04	0.19	(tons per ozone seasonal day)
	0.01	0.04	0.18	(tons per average annual day)
	4.43	14.49	67.08	(tons per year)

1,359,000 horsepower-hr of Heavy Duty Farm Equipment were operated in 1990:

Source Type	VOC	NOx	CO
<b>CES 81919 Off-Road Heavy Duty Gasoline Farm Equipment</b>			
330,000 horsepower-hr	3.07	2.02	61.78
<b>CES 81927 Off-Road Heavy Duty Diesel Farm Equipment</b>			
1,029,000 horsepower-hr	1.36	12.47	5.30
<b>Category Totals (tons per year):</b>	<b>4.43</b>	<b>14.49</b>	<b>67.08</b>

Emissions estimates were made by CARB using area source methodologies. CARB established a state-wide inventory of agricultural heavy duty equipment using annual sales records and an annual scrappage attrition rate broken down by equipment type, horsepower, annual hourly usage, and load factors. This generates a state-wide inventory of agricultural heavy duty equipment. The District inventory is extracted by applying the District's fraction of state-wide agricultural activity (0.04 percent). Emissions are calculated using EPA (AP-42) heavy duty equipment emission factors. The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 1.060, reflecting the increased use of heavy duty diesel farm equipment during the longer summer days.

**Category: Off-Road Heavy Duty Non-Farm Equipment**

	VOC	NOx	CO	
Total Emissions:	0.57	5.31	15.59	(tons per ozone seasonal day)
	0.57	5.31	15.59	(tons per average annual day)
	208.00	1938.99	5689.36	(tons per year)

173 million horsepower-hr of Off-Road Heavy Duty Non-Farm Equipment operated in 1990:

Source Type	VOC	NOx	CO
<b>CES 82164 Gasoline Heavy-Duty Equipment</b>			
26,344,000 horsepower-hr	29.00	161.34	4933.05
<b>CES 83097 Diesel Heavy-Duty Equipment</b>			
146,713,000 horsepower-hr	179.00	1777.65	756.31
<b>Category Totals (tpy):</b>	<b>208.00</b>	<b>1938.99</b>	<b>5689.36</b>

Emissions estimates were made by CARB using area source methodologies. CARB established a state-wide inventory of non-farm heavy duty equipment using annual sales records and an annual scrappage attrition rate broken down by equipment type, horsepower, annual hourly usage, and load factors. CARB then assigns these equipment to construction, mining and logging industries. This generates a state-wide inventory of non-farm equipment by industry. The District inventory is extracted by applying District-specific construction, mining and logging industry activity rates as a proportion to the state totals. Emissions are calculated using EPA (AP-42) heavy duty non-farm equipment emission factors. The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Light Duty Industrial Equipment**

	VOC	NOx	
Total Emissions:	0.07	0.04	0.20 (tons per ozone seasonal day)
	0.07	0.04	0.20 (tons per average annual day)
	25.48	15.53	71.60 (tons per year)

139,000 gallons of fuel were burned in Light Duty Industrial Equipment in 1990:

Source Type	VOC	NOx	CO
<b>CES 54379 Light Duty Diesel Industrial Equipment</b>			
22,000 gallons burned	0.48	4.88	1.05
<b>CES 54387 Light Duty Gasoline Industrial Equipment</b>			
46,000 gallons burned	7.00	0.35	69.26
<b>CES 54429 Light Duty LPG Industrial Equipment</b>			
71,000 gallons burned	18.00	10.30	1.29
<b>Category Totals (tons per year):</b>	<b>25.48</b>	<b>15.53</b>	<b>71.60</b>

Emissions estimates were made by CARB using area source methodologies. CARB estimated industrial light duty equipment activity from equipment sales figures, attrition scrappage estimates, and annual use estimates. Emissions were calculated using light-duty equipment-specific EPA (AP-42) emission factors. District emissions were extracted from the state-wide total using the District proportion of the state-wide population (0.9 percent). The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the

federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Locomotive Operations**

	VOC	NOx	CO	
Total Emissions:	1.40	26.25	4.62	(tons per ozone seasonal day)
	1.40	26.25	4.62	(tons per average annual day)
	511.00	9581.25	1686.30	(tons per year)

10,565,000 gallons of fuel burned in locomotives in 1990:

Source Type	VOC	NOx	CO
<b>CES 47597 Locomotives Road Hauling</b>			
10,257,000 gallons diesel burned	485.00	9139.60	1624.25
<b>CES 47605 Locomotives Switching</b>			
308,000 gallons diesel burned	26.00	441.65	62.05
<b>Category Totals (tpy):</b>	<b>511.00</b>	<b>9581.25</b>	<b>1686.30</b>

Emissions estimates were made by CARB using area sources methodologies. CARB determined county-specific locomotive line haul and switching fuel consumption and applied EPA (AP-42) line haul and switching locomotive emission factors. 90 percent of District-wide line haul emissions were disaggregated to the federal ozone nonattainment area based on track mileage and the location of the Summit in the federal ozone nonattainment area. All of the District-wide switching emissions were disaggregated to the federal ozone nonattainment area as the major rail yard (AT&SF Barstow) is within the federal ozone nonattainment area.

**Category: Off-Road Vehicles**

	VOC	NOx	CO	
Total Emissions:	0.30	0.04	0.99	(tons per ozone seasonal day)
	0.25	0.03	0.81	(tons per average annual day)
	91.00	11.97	295.50	(tons per year)

428,000 gallons of fuel were burned in Off-Road Vehicles in 1990:

Source Type	VOC	NOx	CO
<b>CES 83477 All Terrain Vehicles</b>			
101,000 gallons burned	73.00	1.18	115.65
<b>CES 54411 Four-Wheel Drive Vehicles</b>			
327,000 gallons burned	18.00	10.79	179.85
<b>Category Totals (tons per year):</b>	<b>91.00</b>	<b>11.97</b>	<b>295.50</b>

Emissions estimates were made by CARB using area source methodologies. CARB established a relationship between registered off-road vehicles and non-registered off-road vehicles and

estimated the average vehicle fuel consumption. These factors are applied to District-specific registered off-road vehicle data obtained from the California Department of Transportation. Emissions were calculated using CARB Mobile Source Division four-wheel drive and EPA (AP-42) all terrain vehicle emission factors. The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent). Ozone seasonal day emissions were estimated using a temporal factor of 1.217, reflecting the increased use of off-road recreational vehicles during the warm summer months.

**Category: Off-Road Motorcycles**

	VOC	NOx	CO	
Total Emissions:	0.21	0.01	0.70	(tons per ozone seasonal day)
	0.17	0.01	0.58	(tons per average annual day)
	63.00	4.12	210.41	(tons per year)

142,000 gallons were burned in Off-Road Motorcycles in 1990:

Source Type	VOC	NOx	CO
CES 47464 Off-Road Motorcycle Use			
142,000 gallons burned	63.00	4.12	210.41
<b>Category Totals (tons per year):</b>	<b>63.00</b>	<b>4.12</b>	<b>210.41</b>

Emissions estimates were made by CARB using area source methodologies. CARB established the distribution of state-wide motorcycles between on-highway (with eight percent off-highway use), dual purpose, off-highway, and competition. This distribution is applied to District-specific motorcycle registration records from the Department of Motor Vehicles to determine the District motorcycle population. CARB estimated annual fuel use for each motorcycle category. Emissions were calculated using CARB motorcycle-category specific emission factors. The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population. Ozone seasonal day emissions were estimated using a temporal factor of 1.217, reflecting the increased use of off-road motorcycles during the warm summer months.

#### d. MISCELLANEOUS AREA SOURCES

For the purpose of this document, Miscellaneous Area Sources are typically composed of many individually small but collectively significant sources that do not fall under the District's jurisdiction. "Methods for Assessing Area Source Emissions in California," CARB September 1991, is the primary area source methodology reference.

##### Category: Adhesives and Sealants

	VOC	NOx	CO	
Total Emissions:	0.30	0.00	0.00	(tons per ozone seasonal day)
	0.30	0.00	0.00	(tons per average annual day)
	110.00	0.00	0.00	(tons per year)

717 tons of Adhesives and Sealants were used in 1990:

Source Type	VOC	NOx	CO
CES 83030 Solvent Based Adhesives and Sealants			
137 tons	84.00	0.00	0.00
CES 83063 Water Based Adhesives and Sealants			
580 tons	26.00	0.00	0.00
Category Totals (tons per year):	110.00	0.00	0.00

Emissions estimates were made by CARB using area source methodologies. CARB estimated state-wide adhesive and sealant use through manufacturer surveys. Emissions were estimated using manufacturer data. District adhesive and sealant emissions were extracted from state-wide emissions using the District proportion of the State population (0.9 percent). The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

##### Category: Automobile Fires

	VOC	NOx	CO	
Total Emissions:	0.00	0.00	0.01	(tons per ozone seasonal day)
	0.00	0.00	0.01	(tons per average annual day)
	0.90	0.08	3.55	(tons per year)

334 Automobiles burned in 1990:

Source Type	VOC	NOx	CO
CES 57307 Automobile Fires			
334 autos burned	0.90	0.08	3.55
Category Totals (tons per year):	0.90	0.08	3.55

Emissions estimates were made by CARB using area source methodologies. CARB used the



California Fire Incident Reporting System to identify the number of vehicle fires by county. Emissions were estimated using weighted averages of USEPA automobile structure and component combustion emissions. The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Consumer Products**

	VOC	NOx	CO	
Total Emissions:	2.33	0.00	0.00	(tons per ozone seasonal day)
	2.33	0.00	0.00	(tons per average annual day)
	851.00	0.00	0.00	(tons per year)

851 tons of Consumer Products were used in 1990:

Source Type	VOC	NOx	CO
<b>CES 83089 Consumer Nonaerosol Solvents</b>			
336 tons of solvent consumed	336.00	0.00	0.00
<b>CES 83196 Consumer Aerosol Propellants</b>			
135 tons of solvent consumed	135.00	0.00	0.00
<b>CES 83204 Consumer Aerosol Solvents</b>			
325 tons of solvent consumed	325.00	0.00	0.00
<b>CES 83238 Consumer Aerosol Pesticides - Propellant</b>			
15 tons of solvent consumed	15.00	0.00	0.00
<b>CES 83246 Consumer Aerosol Pesticides - Ingredient</b>			
40 tons of solvent consumed	40.00	0.00	0.00
<b>Category Totals (tons per year):</b>	<b>851.00</b>	<b>0.00</b>	<b>0.00</b>

Emissions estimates were made by CARB using area source methodologies. CARB estimated state-wide consumer product use through market research and manufacturer surveys. Emissions were estimated using product testing and manufacturer data. District consumer product emissions were extracted from state-wide emissions using the District proportion of the State population (0.9 percent). The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Truck Transport Refrigerators**

	VOC	NOx	CO	
Total Emissions:	0.01	0.09	0.04	(tons per ozone seasonal day)
	0.01	0.09	0.04	(tons per average annual day)
	4.00	33.00	15.00	(tons per year)

2,860,000 horsepower-hr of Diesel Transport Refrigeration Units were operated in 1990:

Source Type	VOC	NOx	CO
<b>CES 54353 Diesel Transport Refrigeration Units</b>			
2,860,000 horsepower-hr	4.00	33.00	15.00
<b>Category Totals (tons per year):</b>	<b>4.00</b>	<b>33.00</b>	<b>15.00</b>

Emissions estimates was made by CARB using area source methodology. CARB used District-specific California Department of Transportation data on registered refrigeration trucks and trailers and estimated engine size, load factor, usage and fuel type to determine refrigerator unit activity in horsepower-hour. Emissions were calculated using CARB estimated emission factors. The federal ozone nonattainment area emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population (93.6 percent).

**Category: Unplanned Fires**

	VOC	NOx	CO	
Total Emissions:	0.35	0.08	4.94	(tons per ozone seasonal day)
	0.25	0.06	3.51	(tons per average annual day)
	90.94	20.45	1280.12	(tons per year)

Three categories of Unplanned Fires burned in 1990:

Source Type	VOC	NOx	CO
<b>CES 47308 Wildfires - Grass &amp; Woodland</b>			
203 acres burned	2.77	0.46	20.50
<b>CES 47316 Wildfires - Timber &amp; Brush</b>			
609 acres burned	82.21	18.27	1187.55
<b>CES 47324 Structural Fires</b>			
440 fires	5.96	1.72	72.07
<b>Category Totals (tons per year):</b>	<b>90.94</b>	<b>20.45</b>	<b>1280.12</b>

Emissions estimates were made by CARB using area source methodologies. CARB used California Department of Forestry and United States Forest Service District-specific historical wildfire data, an estimated timber & brush fuel load of 15 tons/acre, and EPA (AP-42) wildfire emission factors to determine District wildfire emissions. The federal ozone nonattainment area wildfire emissions was disaggregated using the federal ozone nonattainment area proportion of the District-wide area (39.45 percent). Ozone seasonal day emissions were estimated using a temporal factor of 1.434, reflecting the increased level of wildfire activity during the warm summer months.

CARB used California Fire Incident Reporting System data for structural fires, an average fuel load of 0.59 tons/fire, and EPA (AP-42) fire emission factors to determine State-wide structural

fire emissions. District structural fire emissions were extracted from the state total using the District's proportion of state housing units (0.9 percent). The federal ozone nonattainment area structural fire emissions were disaggregated from the District-wide emissions using the federal ozone nonattainment area proportion of the District-wide population.

## **Attachment A**

# **Mojave Desert AQMD Revised Rate-Of-Progress Plan VOC and NOx Emission Inventories**

(San Bernardino County Portion of the  
Southeast Desert Modified Air Quality Management Area)

## **Summary**

# Mojave Desert AQMD

## Revised ROP Emission Inventory Summary

### Average Ozone Seasonal Day

Category	Source Totals (tons per os day)		
	VOC	NOx	CO
<i>ROP Baseline 1990 Emission Inventory:</i>			
Stationary Point	5.58	51.05	23.08
Stationary Area	11.38	0.45	0.06
On Road Mobile	23.60	30.25	182.62
Off Road Mobile	2.93	31.71	24.25
Miscellaneous Area	2.99	0.17	5.00
<b>Total ROP 1990 Emission Inventory:</b>	<b>46.50</b>	<b>113.65</b>	<b>235.01</b>
 <i>ROP Forecast 1996 Emission Inventory:</i>			
Stationary Point	6.25	51.22	
Stationary Area	15.82	0.59	
On Road Mobile	13.56	26.20	
Off Road Mobile	3.83	32.37	
Miscellaneous Area	3.74	0.17	
<b>Total ROP 1996 Emission Inventory:</b>	<b>43.20</b>	<b>110.55</b>	

**Notes:**

Ozone season is the three month period from June through August.

Where ozone seasonal activity information was not available annual average data was used.

Values may not total due to rounding.

# Mojave Desert AQMD

## Revised ROP 1990 Emission Inventory Summary

### Stationary Sources

Source Category	Type	(tons per os day)		
		VOC	NOx	CO
Aerochem (Chemical Milling - Etching)	point	0.04	0.02	0.00
AFG (NG Glass Furnace)	point	0.01	2.16	0.03
Agcon (Concrete Batch Plant)	point	0.00	0.01	0.00
Apple Valley Airport (General Aviation Aircraft)	point	0.02	0.01	1.33
Barstow-Daggett Airport (General Aviation Aircraft)	point	0.02	0.01	1.33
Hesperia Airport (General Aviation Airport)	point	0.02	0.01	1.33
Twentynine Palms Airport (General Aviation Airport)	point	0.00	0.00	0.08
AT&SF Barstow Rail Depot (NG Boiler, Petroleum Handling)	point	0.05	0.03	0.10
Barstow WWTP (NG IC Engine and Incinerator)	point	0.00	0.10	0.01
Boral Resources, Inc. (Asphalt Batch Plants)	point	0.00	0.02	0.01
Brubaker-Mann Inc. (Rock Mining and Processing)	point	0.00	0.01	0.00
Cal-West Rock (Rock Mining and Processing)	point	0.01	0.07	0.06
CalNev Pipeline Barstow (Petroleum Terminal)	point	0.07	0.00	0.00
CalNev Pipeline GAFB (petroleum Terminal)	point	0.01	0.00	0.00
Fiberglass Operations (Pacific Tank)	point	0.01	0.00	0.00
Crystal Hills Sand & Gravel (Sand & Gravel Plant)	point	0.00	0.00	0.01
Daggett Leasing (Natural Gas Boiler and Heaters)	point	0.02	0.03	0.02
Edwards Air Force Base (Rocket Test Stands)	point	0.00	0.00	0.05
George Air Force Base (Aircraft, Vehicles, Fuel, Coatings)	point	0.94	1.31	2.86
Harper Lake (Natural Gas Boilers)	point	0.05	0.03	0.03
Hi-Desert Medical (Incinerator)	point	0.00	0.00	0.00
Industrial Asphalt (Asphalt Batch and Sand & Gravel Plant)	point	0.00	0.00	0.01
Kramer Junction (NG Boiler)	point	0.06	0.18	0.08
Memorial Conservatory (Incinerator)	point	0.00	0.00	0.00
Miscellaneous Coaters (Six coaters, ex: Northwest)	point	0.02	0.01	0.00
Mitsubishi Cement (Coal-fired Kiln)	point	0.09	7.04	1.25
Paint & Body Shops (35 shops, ex: Sonshine Auto)	point	0.04	0.00	0.00
Partin Limestone Products (Limestone Mining & Processing)	point	0.00	0.07	0.04
PG&E Hinkley (NG IC Engines)	point	0.82	9.60	1.21
Pluess-Stauffer (Limestone Mining and Processing)	point	0.01	0.01	0.01
Rheox Mine (Clay Mining)	point	0.00	0.06	0.03
Rheox Plant (Clay Processing)	point	0.00	0.02	0.01
Riverside Cement (Coal-fired Kiln and NG Boiler)	point	0.34	9.41	0.73
Saint Mary Desert Valley Hospital (NG Boilers)	point	0.00	0.01	0.00
SCE Coolwater (NG Turbines and Boilers)	point	0.99	4.11	2.35
Sierra Aggregate Co. (Rock Mining and Processing)	point	0.00	0.01	0.01
SoCalGas Adelanto (NG Turbines)	point	0.08	0.68	0.22
SoCalGas Newberry Springs (NG IC Engines)	point	0.43	4.24	0.53
SoCalGas Victorville (Fuel, Degreasing)	point	0.00	0.00	0.00
Southwest Portland Cement Quarry (Coal-fired Kiln)	point	0.21	10.25	3.91
Southwest Portland Cement River (Rock Mining and Processing)	point	0.00	0.11	0.07
Specialty Minerals (Limestone Mining and Processing)	point	0.01	0.10	0.04
USMC AGCC 29 Palms (Boilers, Fuel, Coatings)	point	0.59	0.71	3.46
USMC Logistics Base Nebo (Boilers, Fuel, Coatings)	point	0.08	0.26	0.33

# Mojave Desert AQMD

Source Category	Type	(tons per os day)		
		VOC	NOx	CO
USMC Logistics Base Yermo (Boilers, Fuel, Coatings)	point	0.29	0.21	1.50
U.S. West (NG Boilers)	point	0.00	0.06	0.01
Victor Valley Hospital (NG and Fuel Oil Boilers)	point	0.02	0.06	0.01
Victor Valley Memorial Park (Incinerator)	point	0.00	0.00	0.00
Victor Valley Ready Mix (Concrete Batch Plant)	point	0.00	0.00	0.00
Victor Valley WWRA (Process Gas IC Engine and Flare)	point	0.00	0.01	0.01
Victorville Industrial Minerals (Rock Mining and Processing)	point	0.00	0.01	0.01
Victorville Oil (Petroleum Terminal)	point	0.00	0.00	0.00
Wilde Horse (Aggregate and Concrete Batch Plant)	point	0.00	0.00	0.00
Wood Coaters (Six coaters, ex: C&M Wood Ind.)	point	0.23	0.00	0.00
Agricultural & Commercial Pesticides	area	1.51	0.00	0.00
Architectural Coatings and Thinners	area	5.14	0.00	0.00
Asphalt Paving Applications	area	0.77	0.00	0.00
Commercial Charbroilers (95 charbroilers in 1990)	area	0.13	0.00	0.00
Commercial LPG Combustion	area	0.01	0.25	0.05
Commercial Natural Gas Combustion	area	0.00	0.07	0.00
Gasoline Service Stations (188 stations in 1990)	area	3.26	0.00	0.00
Industrial Natural Gas Combustion (Unspecified)	area	0.00	0.04	0.00
Landfill Biodegradation (15 landfills)	area	0.15	0.00	0.00
Livestock Waste Volatilization (4,815,550 head in 1990)	area	0.41	0.00	0.00
Open Burning (15,802 tons in 1990)	area	0.00	0.00	0.00
Residential Natural Gas Combustion	area	0.00	0.09	0.01
Residential Wood Combustion	area	0.00	0.00	0.00
Stationary Source Totals:		16.96	51.50	23.14

## Notes:

Stationary sources are defined as those point and area sources under MDAQMD jurisdiction

All inventories include "fugitives," when available

0.00 indicates a value < 0.005 tons per day

This is an average ozone seasonal day inventory

# Mojave Desert AQMD

## Revised ROP 1990 Emission Inventory Summary

### Mobile Sources

Source Category	Type	(tons per os day)		
		VOC	NOx	CO
On-Road HD Diesel Trucks	on-road	1.59	12.77	5.63
On-Road HD Gasoline Trucks	on-road	1.44	3.89	29.62
On-Road LD Trucks	on-road	4.36	2.99	35.11
On-Road MD Trucks	on-road	1.63	1.38	11.84
On-Road LD Passenger Vehicles	on-road	14.44	9.19	99.99
On-Road Motorcycles	on-road	0.14	0.03	0.43
Commercial Lawn & Garden Equipment	off-road	0.16	0.00	0.69
Gasoline Recreational Boats	off-road	0.15	0.02	0.58
Heavy Duty Diesel Farm Equipment	off-road	0.00	0.03	0.01
Heavy Duty Diesel Non-Farm Equipment	off-road	0.49	4.87	2.07
Heavy Duty Gasoline Farm Equipment	off-road	0.01	0.01	0.18
Heavy Duty Gasoline Non-Farm Equipment	off-road	0.08	0.44	13.52
Light Duty Diesel Industrial Equipment	off-road	0.00	0.01	0.00
Light Duty Gasoline Industrial Equipment	off-road	0.02	0.00	0.19
Light Duty LPG Industrial Equipment	off-road	0.05	0.03	0.00
Locomotive Road Hauling	off-road	1.33	25.04	4.45
Locomotive Switching	off-road	0.07	1.21	0.17
Off-Road All Terrain Vehicles	off-road	0.24	0.00	0.39
Off-Road Four-Wheel Drive	off-road	0.06	0.04	0.60
Off-Road Motorcycles	off-road	0.21	0.01	0.70
Residential Lawn & Garden Equipment	off-road	0.06	0.00	0.69
<b>Mobile Source Totals:</b>		<b>26.53</b>	<b>61.96</b>	<b>206.87</b>

#### Notes:

Mobile sources are defined as all on- and off-road mobile and area sources

All inventories include "fugitives," when available

0.00 indicates a value < 0.005 tons per day

This is an average ozone seasonal day inventory



# Mojave Desert AQMD

## Revised ROP 1990 Emission Inventory Summary

### Miscellaneous Area Sources

Source Category	Type	(tons per os day)		
		VOC	NO <sub>x</sub>	CO
Adhesives and Sealants	area	0.30	0.00	0.00
Automobile Fires	area	0.00	0.00	0.01
Consumer Aerosol Pesticides - Ingredient	area	0.11	0.00	0.00
Consumer Aerosol Pesticides - Propellant	area	0.04	0.00	0.00
Consumer Aerosol Propellants	area	0.37	0.00	0.00
Consumer Aerosol Solvents	area	0.89	0.00	0.00
Consumer Nonaerosol Solvents	area	0.92	0.00	0.00
Diesel Transport Refrigerators	area	0.01	0.09	0.04
Structural Fires	area	0.02	0.01	0.20
Wildfires - Grass & Woodland	area	0.01	0.00	0.08
Wildfires - Timber & Brush	area	0.32	0.07	4.67
Miscellaneous Source Totals:		2.99	0.17	5.00

#### Notes:

Miscellaneous sources are defined as all area sources not under MDAQMD purview

All inventories include "fugitives," when available

0.00 indicates a value < 0.005 tons per day

This is an average ozone seasonal day inventory

# Mojave Desert AQMD

## Revised ROP Inventory Forecast Summary

### Stationary Sources

(tons per os day)		VOC		NOx	
Source Category 'Industry	Growth	1990	1996	1990	1996
Agricultural & Commercial Pesticides	Ag	1.51	1.77	0.00	0.00
Architectural Coatings and Thinners	HU	5.14	7.45	0.00	0.00
Asphalt Paving Applications	Emp	0.77	0.97	0.00	0.00
Cement Manufacturing (four facilities)	Cement	0.65	0.65	26.80	26.80
Commercial Charbroilers (95 charbroilers)	Pop	0.13	0.19	0.00	0.00
Commercial LPG Combustion	Emp	0.01	0.01	0.25	0.32
Commercial Natural Gas Combustion	Emp	0.00	0.00	0.07	0.09
Concrete and Asphalt Plants (five facilities)	Batch	0.00	0.00	0.04	0.04
Crematoria (two facilities)	Pop	0.00	0.00	0.00	0.00
Electric Utilities and Generators (five facilities)	Electric	1.12	1.13	4.41	4.45
Fiberglass Operations (one facility)	Fiber	0.01	0.31	0.00	0.00
Gasoline Dispensing (300 permits)	Pop	3.26	4.73	0.00	0.00
General Aviation Aircraft (four airports)	Air	0.07	0.08	0.02	0.02
Glass Manufacturing (one facility)	Glass	0.01	0.01	2.16	2.16
Industrial Natural Gas Combustion	Emp	0.00	0.00	0.04	0.05
Landfill Biodegradation (15 landfills)	Pop	0.15	0.22	0.00	0.00
Livestock Waste Volatilization	Ag	0.41	0.48	0.00	0.00
Medical Facilities (three facilities)	Pop	0.02	0.03	0.07	0.10
Military Bases (five facilities)	None	1.90	1.90	2.49	2.49
Mineral Mining and/or Processing (10 facilities)	Mineral	0.03	0.03	0.38	0.39
Coating Operations (13 facilities)	Coater	0.29	0.58	0.03	0.06
Natural Gas Utilities (four facilities)	NG	1.33	1.33	14.52	14.52
Open Burning (15,802 tons in 1990)	None	0.00	0.00	0.00	0.00
Paint & Body Shops (35 facilities)	Pop	0.04	0.06	0.00	0.00
Petroleum Terminals (three facilities)	Petro	0.08	0.10	0.00	0.00
Public Wastewater Treatment (two facilities)	Pop	0.00	0.00	0.11	0.16
Rail Depot (one facility)	Rail	0.05	0.05	0.03	0.03
Residential Natural Gas Combustion	HU	0.00	0.00	0.09	0.13
Residential Wood Combustion	HU	0.00	0.00	0.00	0.00
<b>Stationary Source Totals:</b>		<b>16.98</b>	<b>22.07</b>	<b>51.51</b>	<b>51.81</b>

#### Notes:

Stationary sources are defined as those point and area sources under MDAQMD jurisdiction

All inventories include "fugitives," when available

0.00 indicates a value < 0.005 tons per day

This is an average ozone seasonal day inventory

# Mojave Desert AQMD

## Revised ROP Inventory Forecast Summary

### Mobile and Miscellaneous Area Sources

(tons per os day)		VOC		NOx	
Source Category	Growth	1990	1996	1990	1996
On-Road HD Diesel Trucks	On-Road	1.59	1.84	12.77	12.98
On-Road HD Gasoline Trucks	On-Road	1.44	0.73	3.89	3.42
On-Road LD Trucks	On-Road	4.36	2.07	2.99	2.12
On-Road MD Trucks	On-Road	1.63	0.97	1.38	1.32
On-Road LD Passenger Vehicles	On-Road	14.44	7.83	9.19	6.32
On-Road Motorcycles	On-Road	0.14	0.12	0.03	0.05
Lawn & Garden Equipment	HU	0.22	0.32	0.01	0.01
Gasoline Recreational Boats	Pop	0.15	0.22	0.02	0.03
Off-Road Heavy Duty Farm Equipment	Ag	0.01	0.01	0.04	0.05
Off-Road Heavy Duty Non-Farm Equipment	Emp	0.57	0.72	5.31	6.69
Light Duty Industrial Equipment	Emp	0.07	0.09	0.04	0.05
Locomotive Operations	Rail	1.40	1.36	26.25	25.46
Adhesives and Sealants	Emp	0.30	0.38	0.00	0.00
Automobile Fires	Pop	0.00	0.00	0.00	0.00
Consumer Products	Pop	2.33	3.38	0.00	0.00
Truck Transport Refrigerators	Emp	0.01	0.01	0.09	0.09
Unplanned Fires	None	0.35	0.35	0.08	0.08
Off-Road Vehicles	Pop	0.30	0.44	0.04	0.06
Off-Road Motorcycles	Pop	0.21	0.30	0.01	0.01
<b>Mobile and Misc. Area Source Totals:</b>		<b>29.52</b>	<b>21.13</b>	<b>62.14</b>	<b>58.74</b>

Forecast Totals:	VOC		NOx	
	1990	1996	1990	1996
	46.50	43.20	113.65	110.55

#### Notes:

Mobile sources are defined as all on- and off-road mobile and area sources

All inventories include "fugitives," when available

0.00 indicates a value < 0.005 tons per day

This is an average ozone seasonal day inventory

# Mojave Desert AQMD

## Revised ROP Growth Codes

Source Category	Growth	1990	1996
Electric Utilities and Generators	Electric	1.00	1.01
Asphalt/Concrete Batch Plants	Batch	1.00	1.08
Mining/Mineral Processing	Mineral	1.00	1.02
Petroleum Pipelines/Terminals	Petro	1.00	1.19
Cement Manufacturing	Cement	1.00	1.00
Natural Gas Pipelines	NG	1.00	1.00
Coating Operations	Coater	1.00	2.00
Glass Manufacturing	Glass	1.00	1.00
Composite Fabric/Fiberglass	Fiber	1.00	30.82
Agricultural Activity	Ag	1.00	1.17
Housing Units	HU	1.00	1.45
Population	Pop	1.00	1.45
Industrial/Commercial Employment	Emp	1.00	1.26
Railroad Activity	Rail	1.00	0.97
General Aviation	Air	1.00	1.17

Stationary Source codes were derived by MDAQMD using industry-specific activity forecasts

Area Source codes were derived from SCAG socioeconomic forecasts

On-Road emissions are forecasted based on SCAG activity estimates

## **APPENDIX B**

### **CONTROL MEASURES**

## Control Measures Technical Discussion Document

This document discusses the ROP Plan's control and contingency measures. It identifies control methods, control technologies, emission reductions, costs, and justifications for each control measure.

### I. Stationary Source Control Measures

#### a. Rule 1160 - Internal Combustion Engines

District Rule 1160 requires most internal combustion (IC) engines greater than 250 brake-horsepower (bhp) to reduce their VOC and NO<sub>x</sub> emissions by up to 80 percent. This rule is expected to achieve overall 14 percent VOC and 35 percent NO<sub>x</sub> reductions from 1996 forecasted emission levels.

Rule 1160 does not specify control technology. The rule does specify VOC and NO<sub>x</sub> emission rate limits and compliance schedules for those limits. The costs of this control technology range from \$23,000 to \$50,000 per ton of VOC reduced. The cost effectiveness of the control technology is engine-specific (MDAQMD Rule 1160 Final Staff Report, Cooper-Bessemer proposal).

A cleanburn modification is proposed at the Pacific Gas & Electric's Hinkley facility to reduce NO<sub>x</sub> and VOC emissions. This design is forecasted to achieve at least a 78 percent hydrocarbon emission reduction from IC engines (eg. reducing hydrocarbon emissions from 2.3 grams per brake-horsepower (g/bhp) to 0.5 g/bhp) and meet a 140 ppmv NO<sub>x</sub> limit. The cleanburn modification involves increasing the IC engine combustion chamber air/fuel ratio. This is achieved by scavenging the air system, and combustion controls. The IC engine chamber modification includes a new turbo-charger, inter-coolers, cylinder heads, gas ignitors, power pistons, cylinder liners, and engine control systems, in addition to retarding the ignition timing in the engine.

<b>1996 VOC emission levels from IC engines:</b>	<b>1.25 tpd</b>
<b>1996 NO<sub>x</sub> emission levels from IC engines:</b>	<b>13.84 tpd</b>

(Derived from PG&E and SoCalGas 1990 criteria emission inventories. Emissions from natural gas utilities are not projected to increase, based on forecasts by the industry. Refer to Appendix A - Emission Inventory for more details.)

<b>1996 VOC reductions at a 18% control efficiency:</b>	<b>0.23 tpd</b>
<b>1996 NO<sub>x</sub> reductions at a 44% control efficiency:</b>	<b>6.08 tpd</b>

(Estimated reductions are calculated by multiplying 1996 emission levels by the expected control efficiency.)

**Creditable 1996 VOC reductions at a 80% rule effectiveness:** **0.18 tpd**  
**Creditable 1996 NO<sub>x</sub> reductions at a 80% rule effectiveness:** **4.86 tpd**  
(Rule effectiveness reduces the expected reductions from proposed rules. The default rule effectiveness factor is 80 percent. 1996 reductions are reduced by 20 percent.)

**b. Rule 1113 - Architectural Coatings**

District Rule 1113 (Architectural Coatings) was adopted on November 2, 1992. This rule requires the use of reformulated coatings with reduced VOC contents by March 1, 1993. The District determined that these reformulations will achieve an overall 12 percent VOC reduction from the 1996 VOC emission levels.

Examples of reformulations include reducing the VOC content of: bond breakers from 750 grams per liter (gpl) to 350 gpl; high temperature coatings from 650 gpl to 550 gpl; and traffic paints from 415 gpl to 250 gpl. No additional costs will be incurred from implementing this rule (SCAQMD Rule 1113 Staff Report, District Rule 1113 Staff Report).

**1996 VOC emissions levels from architectural coatings:** **7.45 tpd**  
(Derived from architectural coating use estimates based on the local population. Architectural coating use is forecasted to change proportional to housing units. This will increase the 1990 VOC emission levels by 45 percent in 1996. Refer to Appendix A - Emission Inventory for more details.)

**1996 VOC reductions at a 13% control efficiency:** **0.97 tpd**  
(Estimated VOC reductions are calculated by multiplying the 1996 VOC emission levels by the expected control efficiency.)

**Creditable 1996 reductions at a 95% rule effectiveness:** **0.92 tpd**  
(Rule effectiveness reduces the expected reductions from proposed rules. The District has determined the rule effectiveness of Rule 1113 to be 95 percent through as-applied architectural coatings tests. The 1996 VOC reductions are reduced by 5 percent.)

**c. Rule 461 - Gasoline Transfer Dispensing**

District Rule 461 (Gasoline Transfer and Dispensing) was last adopted on November 2, 1992. This rule requires the use of the California Air Resources Board (ARB) certified equipment (known as Phase II vapor control) to reduce vapor replacement VOC emissions by up to 95 percent. The District determined that 56 percent of the gasoline service station throughput was controlled by Phase II equipment in 1990. The District forecasted that 44 percent of the gasoline service station throughput had Phase II equipment installed after 1990 (Phase II equipment has been completely installed within the federal ozone nonattainment area). This rule will achieve an overall 79 percent VOC reduction from the 1996 VOC emission levels.

Phase II vapor recovery systems collect the gasoline vapors that are displaced out of vehicle fuel tanks with a sealing, or close-fitting vapor recovery nozzle. These vapors are returned to the gasoline storage tank through the vapor recovery nozzle bellows and connected vapor return plumbing. The volume of vapors returned to the storage tank replaces the volume of liquid withdrawn. This covers the surface of the liquid gasoline in the storage tank and retards future evaporation. No additional costs will be incurred from implementing this rule (Source: California Air Resources Board Gasoline Marketing and Distribution Compliance Assistance Program, Phase I & II Gasoline Facilities, March 1991).

**1996 VOC emission levels from gasoline service stations: 4.73 tpd**  
(Derived from service station permitting records and service station surveys. Gasoline throughput is forecasted to change proportional to population. This increases the 1990 VOC emission levels by 45 percent in 1996. Refer to Appendix A - Emission Inventory for more details.)

**1996 VOC reductions at a 82 percent control efficiency: 3.88 tpd**  
(Estimated VOC reductions are calculated by defining the portion of 1990 throughput not controlled by Phase II technology. This throughput will be controlled in 1996 at its forecasted level.)

**Creditable 1996 reductions at a 96.5% rule effectiveness: 3.74 tpd**  
(Rule effectiveness reduces the expected reductions from proposed rules. The District has determined the rule effectiveness of Rule 461 to be 96.5 percent based on a 1992 CARB service station compliance audit. The 1996 VOC reductions are reduced by 3.5%.)

## **II. Mobile Source Control Measures**

### **a. Transportation Control Measures**

The District is not pursuing Transportation Control Measures (TCMs), because on-road motor vehicle emissions are forecasted to decrease the 1990 VOC emission levels from 23.60 tpd to 13.56 tpd in 1996. Additionally, behavior-based TCMs are difficult to quantify and enforce. The District would have to reduce approximately 77,000 daily vehicle trips to achieve a 1 tpd VOC reduction by 1996.

### **b. State Heavy Duty Diesel Equipment Program**

The District is taking credit for VOC reductions achieved from the State heavy duty diesel equipment program. This program sets stringent heavy duty equipment engine emission standards, and requires new equipment to comply with these standards. The state-wide heavy duty equipment fleet will come into compliance with these standards through normal fleet turnover. This program will achieve an overall 20 percent VOC and 5 percent NO<sub>x</sub> reduction



from 1996 emission levels. No additional costs are anticipated from this program (Source: California Air Resources Board Heavy Duty Equipment Regulation package).

**1996 VOC emissions levels from off-road heavy duty diesel equipment: 0.62 tpd**  
**1996 NO<sub>x</sub> emissions levels from off-road heavy duty diesel equipment: 6.17 tpd**  
(Produced by ARB using equipment emission factors and county-specific timber, mining and construction activity data. Future off-road heavy duty diesel equipment activity is forecasted to change proportional to employment. This growth code will increase 1990 VOC emission levels by 26 percent in 1996. Refer to Appendix A - Emission Inventory for more details.)

**1996 VOC reductions at a 20% control efficiency: 0.12 tpd**  
**1996 NO<sub>x</sub> reductions at a 5% control efficiency: 0.31 tpd**  
(Estimated emission reductions are calculated by multiplying the 1996 VOC emission levels by the expected control efficiency. State program rule effectiveness is accounted for in the statewide emissions inventory system.)

#### c. State Lawn & Garden Utility Equipment Program

The District is taking credit for VOC reductions achieved from the state lawn and garden utility equipment program. This program sets stringent lawn & garden utility equipment emission standards for the 1994 model year, and requires new equipment to comply with these standards. The state-wide heavy duty equipment fleet will come into compliance with these standards through normal fleet turnover. ARB forecasts that this program will reduce lawn and garden utility equipment VOC emissions by 28 percent in 1996.

For the 1994 through 1998 model years, engines less than 225 cubic centimeters (cc) displacement have an emission standard of 12 grams per brake horsepower-hour (g/bhp) for total organic gases (TOG) and NO<sub>x</sub>. Engines greater than 225 cc displacement have an emission standard of 10 g/bhp for TOG and NO<sub>x</sub>. Hand-held equipment of less than 50 cc displacement have a TOG emission standard of 180 g/bhp. Hand-held equipment of greater than or equal to 50 cc displacement have an emission standard of 120 g/bhp. 1999 and subsequent model year equipment engines will have to comply with a 3.2 g/bhp TOG and NO<sub>x</sub> standard. Hand-held 1999 and later model year equipment will have to comply with a 50 g/bhp TOG emission standard. No additional costs are anticipated from this program (Source: California Exhaust Emission Standards and Test Procedures for 1994 and Subsequent Model Year Utility and Lawn and Garden Equipment Engines staff report, 10/22/1990).

**1996 VOC emission levels from lawn & garden utility equipment: 0.32 tpd**  
(Produced by ARB using equipment emission factors and state equipment sales, use category activity levels, and county population. Future lawn & garden utility equipment activity is forecasted to change proportional to housing units. This will increase 1990 VOC emission levels by 45 percent in 1996.)

**1996 VOC reductions at a 28% control efficiency:****0.09 tpd**

(Estimated VOC reductions are calculated by multiplying the 1996 VOC emission levels by the expected control efficiency. State program rule effectiveness is accounted for in the statewide emissions inventory system.)

**III. Miscellaneous Area Source Control Measures****a. State Consumer Products Program**

The District is taking credit for VOC reductions achieved from the statewide comprehensive consumer products program. This program sets stringent VOC content limits on a wide range of consumer products, and requires new products to comply with these standards beginning on January 1, 1993, with additional standards phased in through January 1, 1998. The state-wide consumer product inventory will come into compliance with the lower VOC content limits through normal product use and inventory turnover. This program will achieve an overall 18 percent VOC reduction from the 1996 VOC emission levels.

This program includes the VOC content limits for air fresheners (as low as 3 percent by weight), automotive windshield washer fluids (10 percent), bathroom and tile cleaners (5 percent), engine degreasers (50 percent), floor polishes/waxes (7 percent), furniture maintenance products (7 percent), general purpose cleaners (10 percent), glass cleaners (6 percent), hairsprays (55 percent), hair styling gels (6 percent), hair mousses (16 percent), insect repellents (65 percent), laundry prewashes (5 percent), nail polish removers (75 percent), oven cleaners (5 percent), and shaving creams (5 percent). No additional costs are anticipated from this program (Source: Statewide Regulation to Reduce VOC Emissions from Consumer Products - Phase II, October 1991).

**1996 VOC emission levels from consumer products:****3.38 tpd**

(Produced by ARB using product formulation emission factors and state product sales, use category activity levels, and county population. Future consumer product use is forecasted to change proportional to population. This will increase 1990 VOC emission levels by 45 percent in 1996.)

**1996 VOC reductions at an 18% control efficiency:****0.59 tpd**

(Estimated VOC reductions are calculated by multiplying the 1996 VOC emission levels by the expected control efficiency. State program rule effectiveness is accounted for in the statewide emissions inventory system.)

#### **IV. Contingency Measures**

##### **a. Enhanced Inspection and Maintenance**

The District will take credit for VOC reductions achieved from the State Enhanced Inspection & Maintenance (I&M) program as a contingency measure. This program ensures that on-road motor vehicles comply with their applicable tailpipe emissions standard through biennial inspections. This program enhances the State's existing I&M program by requiring centralized emission control repairs. ARB forecasts that this program will achieve an overall 14 percent VOC reduction from 1996 VOC emission levels. No additional costs will be incurred from implementing this program.

**1996 VOC emission levels from light and medium duty vehicles: 10.87 tpd**

(Produced by ARB using BURDEN7F and EMFAC7F on-road mobile source models. The BURDEN model estimates vehicle activity levels. The EMFAC model estimates vehicle emissions based on actual vehicle fleet mix data and local activity indicators. Future on-road vehicle activity is estimated using socioeconomic activity forecasts. Refer to Appendix A - Emission Inventory for more details.)

**1996 VOC reductions at a 14% control efficiency: 1.51 tpd**

(Estimated emission reductions are calculated by multiplying the 1996 VOC emission levels by the expected control efficiency. State program rule effectiveness is accounted for in the statewide emission inventory system.)

